ForesTalk

RESOURCE MAGAZINE SPRING 1980

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ForesTalk

Volume 4 Number 1 Spring 1980

Executive Editor: **Garth Coward**
Editor: **Cameron Young**
Design: **Ken Seabrook**

ForesTalk Resource Magazine is published quarterly by the Province of British Columbia, Ministry of Forests, Information Services Branch, 1450 Government Street, Victoria, B.C. V8W 3E7. Telephone: (604) 387-5985.

Designed to encourage interest, discussion and understanding of British Columbia's forest, range and recreational resources, ForesTalk is available free on request. Second class mailing registration No. 3863. International Standard Serial Number ISSN 0700-1770.

ForesTalk welcomes submissions from professional writers and photographers on themes related to the B.C. forests and their uses. Address enquiries to the editor.

Deputy Minister of Forests:
T.M. Apsey
Director, Information Services Branch:
J.R. Cox

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Tom Waterland

Hon. Tom Waterland, *Minister of Forests*

Province of British Columbia Ministry of Forests

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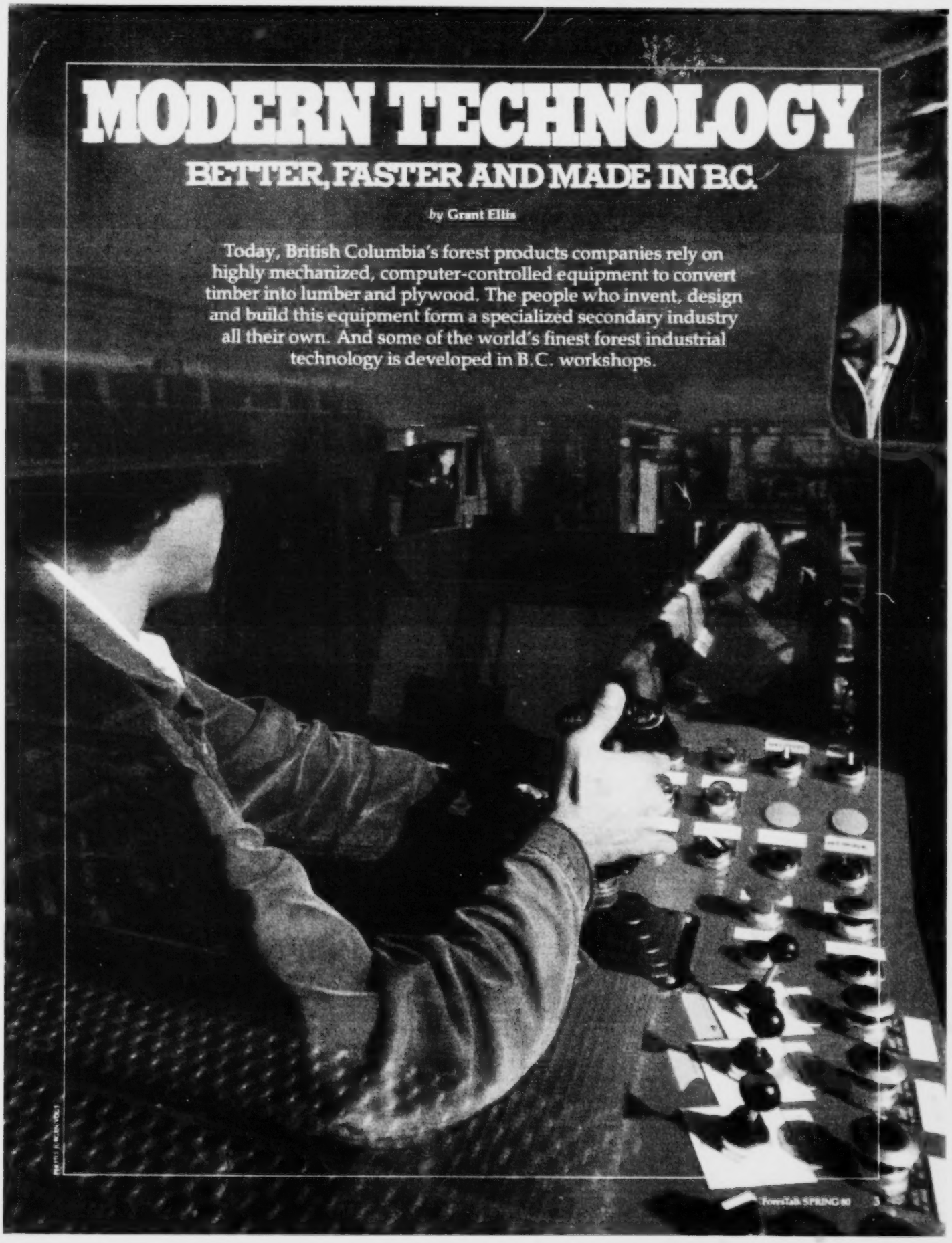
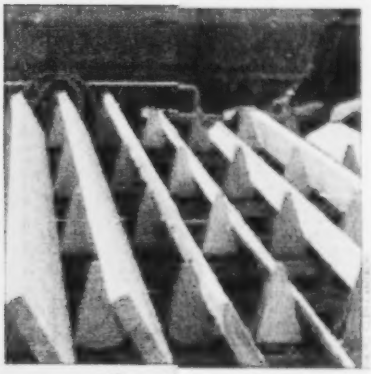
MODERN TECHNOLOGY

BETTER, FASTER AND MADE IN B.C.

by **Grant Ellis**

Today, British Columbia's forest products companies rely on highly mechanized, computer-controlled equipment to convert timber into lumber and plywood. The people who invent, design and build this equipment form a specialized secondary industry all their own. And some of the world's finest forest industrial technology is developed in B.C. workshops.





Over the past seven years microscopic electronic circuitry has revolutionized the sawmill industry. Solid-state computers now control any number of sawmill operations once handled manually. The highly computerized bucking station in Crown Zellerbach's Fraser Mills sawmill (previous page) was developed by Lloyd Controls of Port Coquitlam. The computer studies the incoming log and determines the best possible cut. The operator monitors the process and can over-ride the computer's decision if necessary.

Wayne Follett of Lloyd Controls (top) examines the inner workings of a new computer his company is developing for another B.C. sawmill. "The greatest demand now is for control systems for lumber sorters," says Follett, such as the one Lloyd Controls recently installed at Northwood's Upper Fraser sawmill (above).

As a two-ton log rumbles into a mill, automatic optical scanners precisely measure it so that a half-inch-long silicon 'brain' filled with microscopic circuitry can tell a giant circular saw just where to cut it to length. Up the line, photoelectric eyes enable a computer to examine a log so (in about three thousandths of a second) it can come up with the best cut to turn the log into lumber. Further along, the sawn lumber moves in a jerky industrial ballet, finally joining other pieces of its grade and size in one of several dozen bins. Not far away, a steel blade peels 600 feet of veneer per minute from a thick fir log; sensors measure off four-foot sheets and a high-speed blade clips them off.

Given today's swiftly rising costs of logs and the need for better wood utilization in the mills, the change to new technologies was inevitable. But where do they come from? Who dreams them up and makes them work?

While scores of companies around the world specialize in forest industrial equipment, B.C.'s own equipment-makers rank with the world's best. That is the considered opinion of Al Moul, sawmill specialist for H.A. Simons, consultants to the international forest products industry. One of several such firms based in Vancouver, Simons designs mills of all kinds for installation in South America, Europe, Australia, and the Philippines. Simon's first loyalty, naturally, is to its customers; the company chooses and recommends equipment without special regard for the country of origin. In this world-wide competitive market, B.C. manufactures are often the pick of the field. Here is a look at how some of them work.

The Computer Revolution

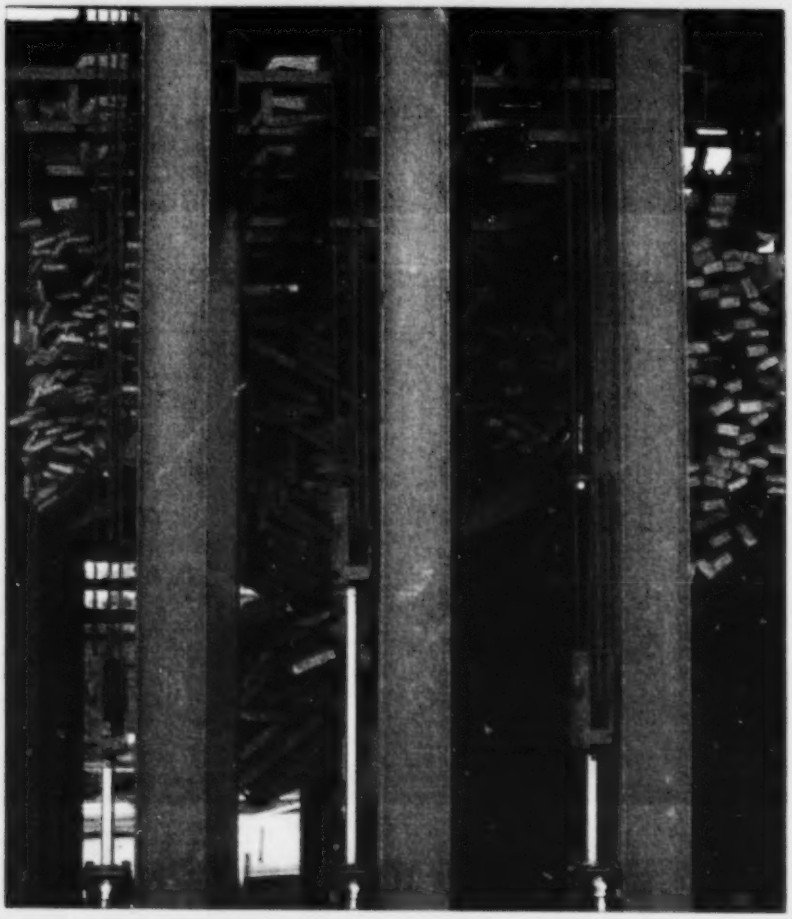
The use of solid-state computers with microscopically small integrated circuits started in the forest industry only seven years ago, but it has revolutionized the sawmill industry. Computers control log sorters, lumber sorters, head rigs, bucking stations, slasher decks, end-doggers, setworks — virtually everything formerly monitored by decision-making humans. The heart of these operations consists of electronic circuit boards crammed with integrated circuits so small that hundreds of them would fit in a thimble. Each of these tiny chips started life as several ten-foot-square drawings of a complex circuit, reduced to microscopic size, then etched in layers into a specially grown silicon crystal which uses only a tiny bit of electricity. Control circuitry that would have been the size of a basketball court in 1950, filled a room in 1960, fitted into a cigar box a decade ago, and now fits on a postage stamp.

Computers, once intelligently programmed, can make decisions dispassionately in milliseconds, are rarely wrong, and have a lot of fingers to count on. A small-log-mill controller manufactured by Hawker Siddeley Canada Limited's Canadian Car Division (CanCar), for example, keeps track of everything: number of logs cut, their lengths, their diameters, the cuts. It predicts lumber production, records downtime, and tells the story of the whole work shift.

Today, a mill owner who decides to modernize can choose among dozens of different brands of electronic technologies, many doing different jobs. He can select units designed to suit individual machines, or computers which can control an entire section of a mill. Electronic technology has reached the point whereby the mill owner can punch in current lumber prices and his gear will automatically turn out the type of lumber that will bring in the most money. Alternatively, he can set the controls so that the computer will make sure that every cubic inch of wood winds up as lumber, not wood chips. There are also programs designed to balance price and utilization at the same time, trying for the highest possible returns in each category.

One indication of how things are going is the success of Lloyd Controls Ltd. of Port Coquitlam. The autonomous affiliate of an American company, Lloyd is one of several B.C. firms which offer computerized controls for forest industry machines. The staff has grown from 16 to 43 people in a year, and is perilously close to outgrowing its latest quarters.

"The greatest demand now," says sales manager Wayne Follett, "is for control systems for lumber sorters." The company recently supplied such systems to Northwood Mills at Upper Fraser and to the Tahsis company, with similar installations destined for the British Columbia Forest Products plant at Youbou and MacMillan Bloedel's mill in Port Alberni. Lloyd equipment will also control a $200,000



Goodbye, Green Chain

The time was that anyone down on his luck or out of work could always head for a sawmill and "pull on the green chain." But lumber sorting, like log presorting, has now been automated, and the best lumber sorters are made by firms in B.C. Says forestry consultant Al Moul: "There are lots of them. LSI, Newnes, Moore, CAE, and Harvey Engineering all make good ones."

Newnes, a Salmon Arm company, installed the computerized machine that sorts green lumber at the Gorman Brothers sawmill in Westbank, near Kelowna. As each piece passes the grader operator, the operator presses a button to give it a grade. The computer measures the piece, notes its grade, and drops it in one of 28 bins.

There are other good sorters, stackers, and stick placers on the market, but the Newnes people are feeling good about their products these days. According to Al Moul, Newnes recently won an international "sort-off" against companies from all over the world, walking off with a $500,000 Australian order.

head rig at the MacMillan Bloedel Port Alberni plant, automated bucking, scaling, and log presort systems at Plateau Mills, and a variable-speed lathe at MacMillan Bloedel's Port Alberni mill.

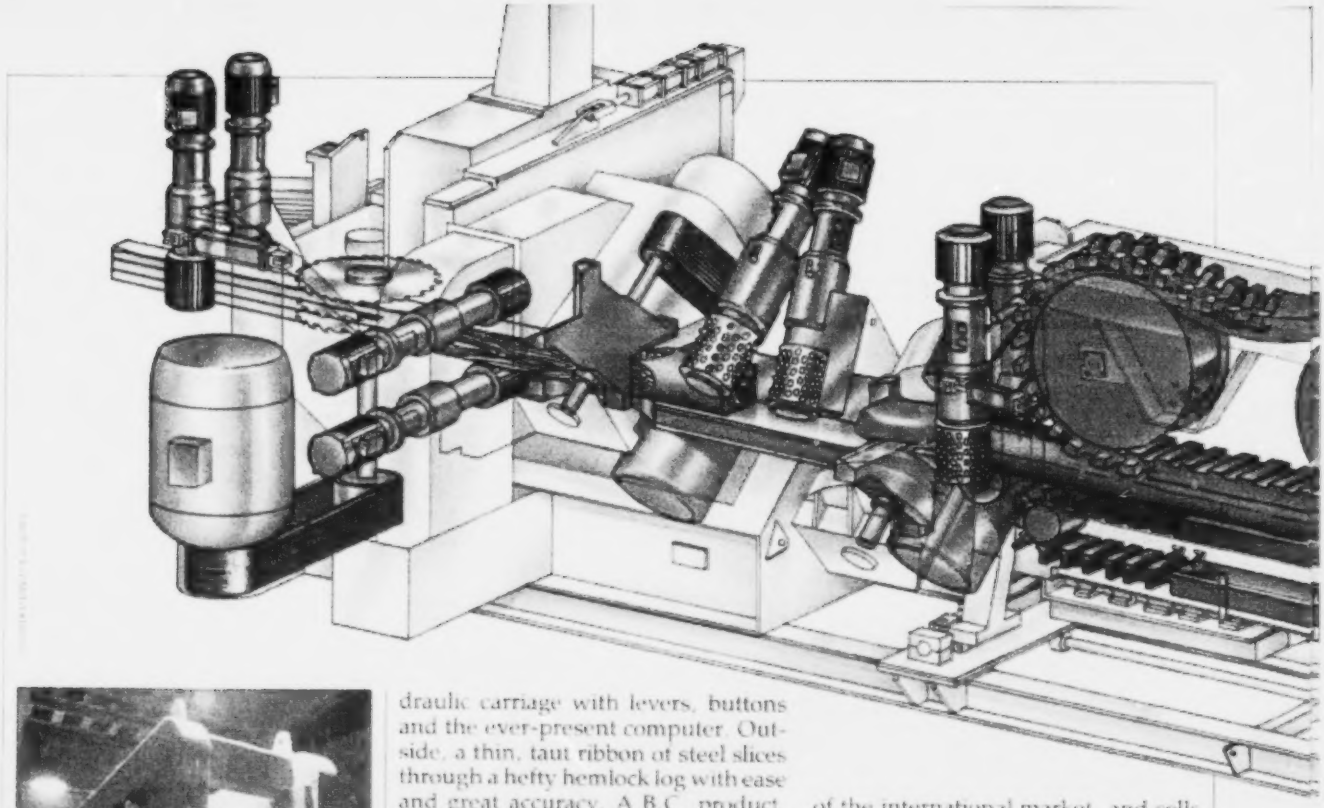
What kind of difference can a computer make to a sawmill? The people at Lloyd's point to Plateau Mills' Engen facility, where a computer has taken over the job of deciding, at high speed, the most profitable lengths into which each log should be cut. One study of this technique showed a probable three per cent increase in average sales value of recovered lumber — enough to add $325,000 in profit for the specific case studied. And that is just one phase of the mill operation.

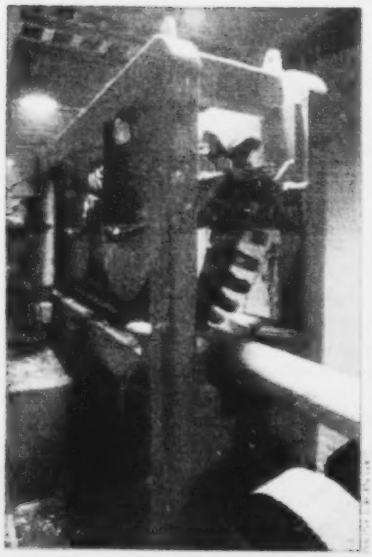
Efficient as they can be, computers are not without their shortcomings. For one thing, they are made and programmed by fallible humans. And they tend to frustrate mill superintendents and millwrights. Says Bill Friedrich, Superintendent of the Canadian Cellulose Limited (CanCel) sawmill in Castlegar: "Computers are great. But when something goes wrong, there's nothing you can get your hands on to fix." Only a computer specialist can handle it. And at some remote mills, you can't find one on less than two days' notice. For that reason, and others, Friedrich's computerized small-log mill has switchable controls; the sawyer can override the computer at anytime.

Sawmills In Transition

The steam-driven head rig was the heartbeat of B.C.'s early sawmills. It took up to seven hardy men to run giant logs through the rig: two workers winched logs onto the carriage, two controlled the saws, and three rode the carriage with the log (the doggers kept it from rolling, and the setter positioned it for the cut). Today's headrig sawyer sits in a booth surrounded by safety glass, isolated from much of the noise his equipment makes, controlling a high-speed hy-

Computers, once intelligently programmed, can make decisions dispassionately in milliseconds, are rarely wrong, and have a lot of fingers to count on. There are dozens of brands of electronic technologies on the market today, and in this world-wide competitive arena, B.C. manufacturers are often the pick of the field.





A growing demand in B.C. sawmills is for specialized machinery to process logs with small diameters. The Chip-N-Saw in Crown Zellerbach's Fraser Mills plant (above) is one of over 300 such small-log milling units operating in a number of countries. Developed locally by CanCar, the Chip-N-Saw receives the raw log in one end of its self-contained mechanism and, through a sophisticated chipping and sawing procedure (top), turns out the most lumber possible from each log handled.

draulic carriage with levers, buttons and the ever-present computer. Outside, a thin, taut ribbon of steel slices through a hefty hemlock log with ease and great accuracy. A B.C. product, the bandsaw makes such a narrow cut that the mill gets an extra piece of lumber out of every log.

"The best bandmills in the world are made right here, by CanCar, Kockum, and CAE," says Al Moul of the Simons consulting firm. CanCar traces its corporate lineage to Britain, and Kockum to Sweden, but the technology is home-grown, and the equipment is made on the lower mainland. So are many other elements of modern sawmills, and these also rank with the best the world has to offer. "We like Moore Canada's edgers and trimmers," says Moul. They're among the best. In fact, there are many companies here making excellent precision end-trimmers. And Mainland Engineering makes world-class edgers."

Another area in which Canada has a worldwide reputation is small-log milling equipment. CanCar's Chip-N-Saw is the clear leader, with some 300 machines now operating in a number of countries. Bill Friedrich of Canadian Cellulose explains the current popularity of small-log milling: "We bought the Chip-N-Saw because we were tying up the head rig with logs with four-inch tops. We needed a separate small-log mill to free up the head rig for big logs."

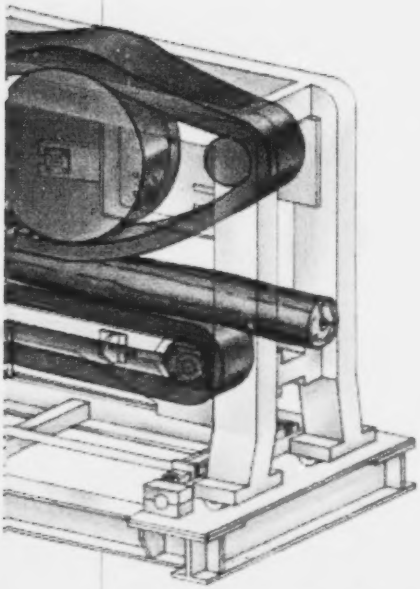
CanCar is not the only small-log-mill maker, but it has the lion's share of the international market, and sells through branches in Europe and the U.S. Of course, like all machines, the Chip-N-Saw falls short of perfection. At Cancel's Castlegar operation, Bill Friedrich interrupts a plant tour long enough to cut loose a log that had slipped from the Chip-N-Saw's conveyor to wedge itself in the end housings. "Some people say that they have 30 per cent downtime with it," he says. "I'm not happy with ours yet, but anything that can handle two or three thousand logs in one shift is all right."

Banishing Bottlenecks

They've been making plywood in B.C. since the 1920s, and the basic technique hasn't changed since then: shave a thin layer of wood (veneer) from a rotating log, cut it into sheets, and glue them together. But New Westminster's Durand Machine Company, a major supplier to the plywood industry, has speeded things up with some important refinements. Its co-labourer in these efforts has frequently been the big Canadian Forest Products' (CANFOR) plant in New Westminster, one of Canada's largest plywood and hardboard facilities.

Until 1978, CANFOR's lathes could only operate at 300 feet of veneer per minute. The bottleneck: slow-moving air-operated clippers which cut the

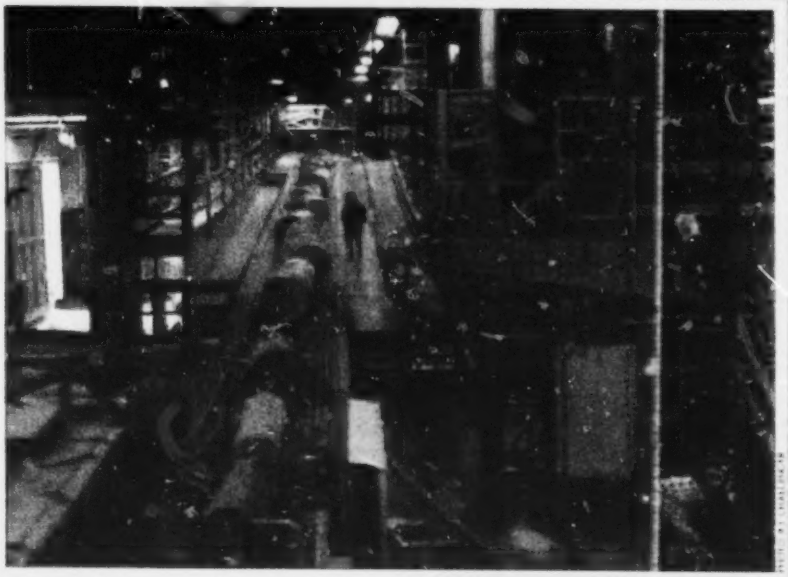
The Chip-N-Saw produces quality lumber from small diameter logs while still producing marketable chips, all in one pass.



veneer into four-foot widths as it came off the lathe. Durand installed a prototype rotary clipper. As the veneer sheet passed beneath a big roller, a narrow steel blade flicked downward, cutting the veneer with a quick thump. Once the rotary clipper proved to be successful, a production machine was installed and the veneer began coming off at up to twice the speed — 600 feet per minute. Double production, and you immediately have the industry's attention: Durand is supplying rotary clippers in Lillooet, Port Alberni and Chilliwack.

How Do B.C. Mills Rate?

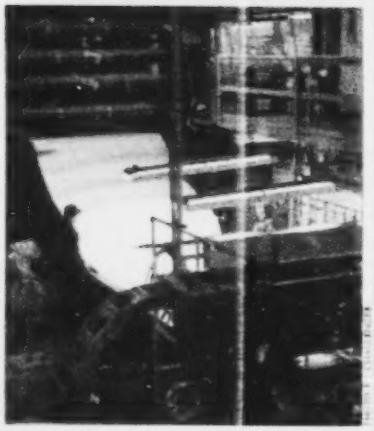
One standard way of measuring sawmill efficiency is by determining how many board feet of lumber a mill can produce from a cubic foot of timber. Consultant Al Moul feels that B.C. mills might average 6.5 board feet per cubic foot. The most efficient mill in the province is probably Fraser Lake Forest Products, which boasts a recovery factor of 7.8. By comparison, Moul's firm has installed mills in Australia which are getting 9.0 — "enough to pay for the whole mill with the difference." But there are other things to consider, besides the ratio of board feet to cubic feet, when it comes to processing timber.



Some B.C. sawmills are part of an integrated complex where pulp mills depend on a regular and ample supply of chips from the sawmills. Most wood waste from the sawmills is therefore channelled into the pulp operations or is converted into fuel to run the plants. Because of this arrangement, marginal timber, which could possibly be converted into lumber, can just as easily be used for other purposes.

Then there are the economic considerations. Lumber prices are like diamond prices: you pay more for one big piece than you would for an equal volume of smaller pieces. A mill operator will go for the larger dimension every time, all things being equal, because he can sell the bigger pieces for more money, even if he winds up with more chips.

Still, dozens of B.C. mills, especially in the interior, recently rebuilt sections of their mills to improve efficiency in lumber recovery. Lasers are being used to measure the length, width and height of logs; ultrasonic measuring devices are being experimented with; infinitely variable saws accommodate each log individually to make the best possible cut. Add these and other new technologies together and the result is ten to 35 per cent more boards for each log entering the mill. Overall, the trend in the B.C. forest industry is towards producing the least possible waste, getting the maximum use out of each tree, and using a great deal of technology developed in its own back yard.



At CANFOR'S plywood plant in New Westminster eight-foot veneer logs rumble along a conveyer (top) towards a lathe which shaves them into thin wood fibre sheets. These sheets then enter the recently installed Durand rotary clipper (above) where they are cut into four-foot widths at up to twice the speed — 600 feet per minute — previously attainable by the slower air-operated clippers formerly used at the mill.

Collections

A Striking Development

Of all wood products developed through the years, perhaps the one most taken for granted is wooden matches. Originally, each match stick was cut by hand, making it a bit of a luxury item. In the early 1800s matches were selling for about four for one penny. In 1841 matches became a mass-produced item when a machine was invented which made match splints by driving a number of circular cutting tools through a block of wood.

High quality pine was used in the making of matches until 1960. The pine was air dried in two-inch planks, then sawn across the grain into short blocks. These blocks were then processed into match sticks at the rate of one million per hour. Today, wooden matches are made from poplar or aspen logs, which are converted to match sticks by a veneer and chopping process. The wood splints are dipped in paraffin, coated with the igniting composition and packaged — all by machine.

The making of matches became a growing industrial concern in the 19th century and also a growing health concern: the phosphorus used in the igniting composition produced a serious disease in workers. A safer phosphorous formula was soon developed, which is basically the same one used today.

"WILD" SILK

Most silk is produced in the Orient by domesticated silkworms which usually eat nothing but white mulberry leaves; this makes the worms an expensive form of livestock. In India, however, there is an extensive and centuries-old cottage industry based on "wild" silkworms. Here, the tasar silkworm lives in the forests and feeds on a wide variety of common leaves. Over a million rural people are employed in gathering and weaving this silk, and India's current export in silk produced by the tasar silkworm amounts to approximately $4.5 million.

The Cary Fir: A Double Hoax

Of all the legends from the golden age of logging in B.C., the most intriguing and most debated concerns the fabled Cary Fir. *Collections* last reported on this tree ("The Big Tree Hoax") in the Spring 1978 issue of ForesTalk. At that time we declared that the story of the fir — allegedly 417 feet tall, 25 feet through at the stump, and felled by George Cary in Lynn Valley in the late 1800s — was in fact a prank dreamt up by a B.C. lumbermen's social club, The Order of the Hoo Hoo. We also said that the tree in the accompanying famous picture associated with the hoax was actually a California Redwood. Since then, A.C. Carder of Victoria has done considerable research into this topic, and believes he has uncovered what amounts to a second hoax. Read on.

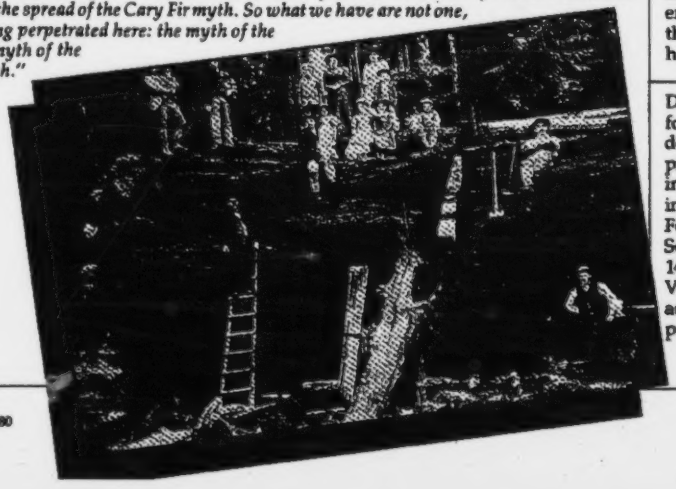
"Accounts of the Cary Fir go back beyond 80 years, often accompanied by the same photograph. For five decades the story and the photo were largely accepted as fact, but 30 years ago doubt began to creep in and eventually both were declared to be fakes. It is now known that this should not have been quite so.

"To support their claim that the Cary Fir was a phony, its detractors also declared the photograph to be humbug. Former Vancouver archivist Major J. S. Matthews, who brought forward the explanation that the Cary Fir story was a Hoo-Hoo hoax, claimed that the tree in the photograph was a California redwood. Others considered it to be a photograph of a fir, all right, but one that was doctored. Supposedly the human figures, dog and tools were superimposed over the picture of a fir, after suitable reduction in scale.

"None of this is true. The Cary Fir is a myth all right, but the photograph is authentic. It depicts a monstrous Douglas-fir felled in 1896 in the Kerrisdale district of Vancouver. This tree was a genuine record-breaker: a still-growing tree which was 13 feet, 8 inches at the butt of the first log, and almost 400 feet tall. Admittedly, the Kerrisdale fir lacks the legendary statistics of the Cary Fir, which customarily were paraded in the press as 25 feet through at the stump and 417 feet high.

"But that's not all. Contrary to archivist Matthews' conjecture, the Order of the Hoo-Hoo had nothing to do with the spread of the Cary Fir myth. So what we have are not one, but two hoaxes being perpetrated here: the myth of the Cary Fir, and the myth of the 'phony' photograph."

A.C. Carder
Victoria, B.C.



THE DOG-WOOD "HOAX"

When the soft white blossom of the dogwood comes into bloom, British Columbians know for certain that spring has arrived. No wonder that this cheery display was selected as the provincial "flower." Unfortunately, the white blossom of the dogwood is not really a flower at all. If you want to be technical about it, the dogwood's real flower is that inconspicuous little cluster of yellowish heads in the centre of the blossom. The distinctive white, petal-like parts of the dogwood are actually "bracts" — brackets or frames for the true flower.

And to add insult to injury, the most impressive specimens of our dogwood emblem grow south of the border where, in the forests near Puget Sound, dogwood trees have been known to reach 100 feet.

Do you know any interesting facts about forests? Don't hold them back. *Collections* deals with anything from machinery to forest products and uses, from unusual facts and interesting people to forest legends. We invite you to contribute. Mail submissions to: ForesTalk — Collections, Information Services Branch, Ministry of Forests, 1450 Government St., Victoria, B.C. V8W 3E7. Information should be brief, accurate, and sources included where possible.

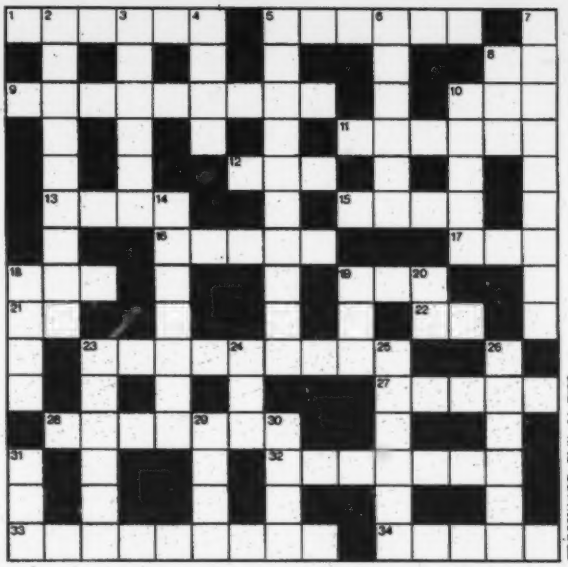
THE CAULIFLOWER TREE REVISITED

The picture of the Cauliflower tree in Collections *(ForesTalk Fall 1979) is not real at all. My friend now thinks that the top of this tree is all white – like a real cauliflower. I have seen the actual tree and there is no way that I could explain how it really is. I would like you to put a real picture of the Cauliflower tree in your magazine."*

L. Woods
Nelson, B.C.

The cauliflower tree is located just south of Brisco, near Highway 95 between Invermere and Golden. It is a 72-foot tall Douglas fir about 160 years old, located on private Christmas tree land; other merchantable timber in the area has long since been logged. What caused the cauliflower-like malformation is not known, but some virus or other disruptive factor has certainly affected its growth pattern. The stylized drawing of the tree which appeared in the Fall 1979 issue of ForesTalk does not depict it accurately, so we are printing a recent photograph of the tree taken by Invermere Forest Ranger G.M. Cartwright. There is probably no other tree like it in the world.

ForesTalk Crossword



CROSSWORD: Philip Lindell

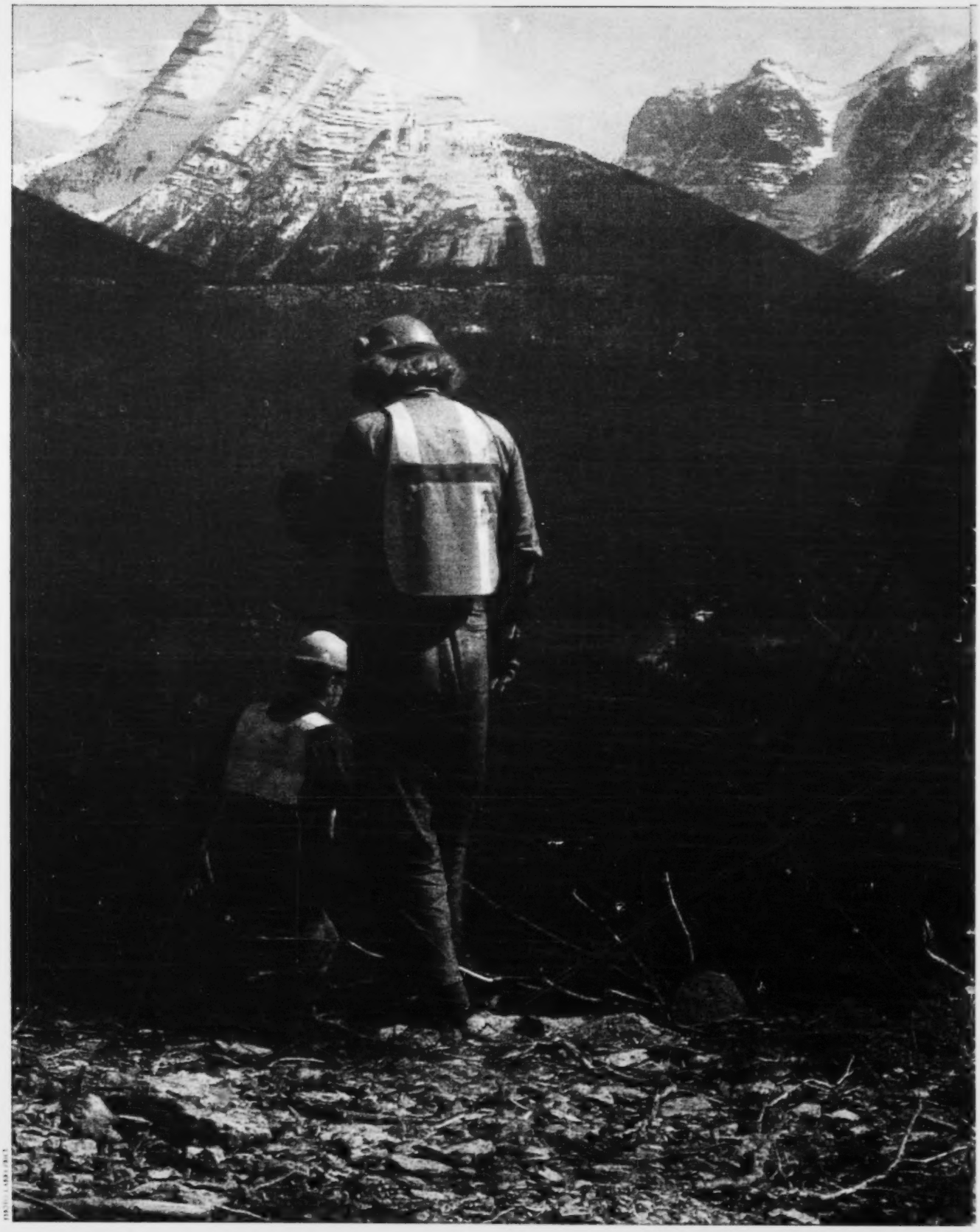
ACROSS

1 The season of blossoms, when things _____ to life (6)
5 Plant life that does not possess chlorophyll and can flourish in darkness; often found in forms growing on trees (6)
8 Interjection expressing sudden emotion (..., look at that tree!) (2)
9 Burning commonly occurring during dry seasons and affecting mainly shrubs and undergrowth (9)
10 A railway carriage, usually freight (3)
11 Small succulent fruit with round stone or pit in the middle (6)
12 The receding of the tide (3)
13 Thick spongy tissue in stems and branches, orange peels and explorers' hats (4)
15 To germinate and then sprout, and continue increasing in size to maturity (4)
16 A tree with smooth shiny grey bark, related to the birch, often the first tree species to grow back on cleared land in low elevations (5)
17 Latin name for the sun, the sole life-giving force in our planetary system (3)
18 Forestry contributes greatly each year to the country's overall earnings, or ... (Abbreviation) (3)
19 Common name for large articulated logging truck (3)
21 Abbreviation for latin term meaning "that is" (2)
22 Abbreviated sign that everything is all right (2)
23 The catchment area of a river system (9)
27 A large farm for raising cattle (5)
28 Selecting and placing logs into groups (7)
32 Having an organized living physical structure (7)
33 The process by which green plants receive energy from the sun is photo_____ (9)
34 Term for describing a perpendicular rock face (5)

DOWN

2 Spine-covered rodent found in North America (9)
3 Small invertebrate animal you should not allow to bug you (6)
4 A mistake that can hook a fish (4)
5 Areas of land where groups of trees are planted to draw off fire when it takes hold in a forest (10)
6 A kind of burrowing rodent found in North America; or the kind of wood Noah's Ark was said to be made from (6)
7 The form a larva enters into prior to adulthood; especially caterpillars (9)
8 Long paddle, usually of wood, for propelling a rowboat (3)
10 Large black carrion birds found in many parts of B.C. (5)
14 Place of abode, a term often used in references in nature (7)
18 Respiratory organ of fish (4)
19 Coarse cereal grain popular in a liquid form (He said with a ... grin) (3)
20 In the forest, green means plant life; in the world of automobiles it means ... (2)
23 Description of any substance made from timber (6)
24 Salmon go up river on their spawning ... (3)
25 Wood nymphs from greek mythology; or commercials that are not wet (6)
26 You might have had one at the end of your nose in January (6)
29 A small island (4)
30 A large, fairly treeless Asian desert (4)
31 Being a high rigger has its ... and downs (3)

Answers page 28



The limited forest land base of the Kootenays — B.C.'s mountainous southeastern corner — is the subject of lively debate these days. Can competing forest users settle their differences so that the forest industry gets its logs, home-owners their water, hikers their wilderness, hunters their game, and tourists their vistas, all from the same piece of land?

MULTIPLE-USE ON TRIAL

IN THE KOOTENAYS

by Peter Grant

Assistant ranger John Gray is driving a visitor along the rough roads of the Blewett, a mountain slope just west of Nelson, to see a rather unusual logging operation. "The whole idea is to disturb the landscape as little as possible" Gray explains. The landscape of plunging slopes, gushing creeks and thick forests is typical of the Nelson area. The visitor has to remind himself that people live nearby, that a suburb of Nelson draws its water off this slope.

With a thick sowing of grass and clover on the road sides and the landings, the area looks like a park. This impression grows as the visitor climbs out of the four-wheel-drive pickup and strolls into a stand that has been logged selectively — still treed but much less brushy than the deeper forest. The odd bright orange stump and some faint tire tracks are the only evidence of the previous day's logging.

Whether it concerns logging in the Golden area (previous pages) or hiking in the Purcell Mountains (previous page) everything involving the forests in the Kootenays is controversial. The problem — a host of forest users competing for the same mountainous, limited land base.

When residents of the Blewett area west of Nelson reacted strongly to Crestbrook Forest Industries' intentions to log in their watershed, a committee with representation from the forests ministry, Crestbrook and Blewett residents was formed to work out an ecologically sound logging plan agreeable to all parties. This included selective logging procedures, the use of machinery causing minimal environmental damage (top) and careful road building. Assistant Ranger John Gray (above) inspects a culvert location for a road under construction.

Higher up the slope, in a spruce-balsam forest, a lone Cat operator is building a narrow side road. "He'll use the slash for the road bed," Gray points out. "He just tucks it under him with his backhoe, like a goose building her nest." Supervising the logging activity is Crestbrook Forest Industries' Joe Tress. He interrupts a conference with his crew to point out some of this operation's side benefits: long-term employment for local loggers and road access for hunters and hikers.

The visitor is disappointed that there is so little to take pictures of, but it's what you *can't* see that's striking about this operation. Most remarkable is this: The whole logging show was planned jointly by Crestbrook, a committee of Blewett water users, and the Ministry of Forests. The visitor begins to see why people in town talk so much about "the Blewett."

"Everything involving the forests is controversial here," says a Ministry of Forests officer in Nelson. Conflict between communities and forest products companies over logging in watersheds is common, and the watershed controversy is only one of many land-use issues in the Nelson area. Special interest groups have locked horns in the past decade over parkland, recreation areas, tourist corridors, hydro rights-of-way, dams, wildlife preserves, as well as other forest management issues such as logging beetle-infested timber and logging on steep slopes. When these conflicts arise, according to Ministry of Forests Nelson Regional Manager Maurie Isenor: "The Forest Service is always caught in the middle." It's Isenor's responsibility to make the final land-use decisions for the 3.8 million hectares of productive forest land in the Nelson Region, a Ministry of Forests management area extending westward from the Monashee Mountains to the Kootenays and the Alberta border.

Why so much controversy? Given the mountainous character of the region, the productive land-base is limited, and there are a host of users. The forest industry, drawing heavily on fast-growing timber in the moist western slopes of the region's four mountain ranges, has more than doubled production in the past two decades. Since 1964, however, five large dams spawned by the Columbia River Treaty have removed some 40,000 hectares of valley bottom from use, and Hydro power lines have carved almost as much again out of the forests. Meanwhile, a rash of rural settlement in such areas as the Slocan valley has occupied thousands more hectares. Wilderness travel in the high country of the Selkirk and Purcell mountains snowballed in the 1970s, as has tourist traffic, escalating the demand for unspoiled back-country and park facilities. Recreationists and loggers clash over small but very touchy issues, such as logging shows which are visible from a highway. As a result, the idea of multiple-use — that a piece of land can be shared by several users — is being put to the test of public debate in the Kootenays.

Probably the biggest land-use battle of the 1970s was over what is now called the Purcell Wilderness Conservancy, a large alpine tract northeast of Nelson. When several logging companies began developing logging plans for the area early in the decade, strong local reaction led to a protracted public discussion on the merits of conservation versus multiple-use logging. The government created the Purcell conservancy in 1974; logging was excluded in favour of recreation and conservation values. But the debate continues. Wilderness enthusiasts point to the recreational potential of such areas which, they claim, would be spoiled by logging shows. On the other side, Kootenay Forest Products (KFP) woodland manager Wayne Morrison maintains that a lot of valuable timber is going to waste because the boundary lines of the park block a key logging access route up the Fry Creek canyon from Kootenay Lake.

Conversely, Nelson Fish and Wildlife Branch biologist Ken Sumanik says: "There's no way they could build a road to that timber without destroying the Fry Creek canyon." Sumanik feels that preserving what real wilderness is left in the Kootenays is important. "As soon as you provide road access, the area loses its integrity as wilderness." KFP president Jack Sigalet, however, rankles at such single-use views: "I don't see why timber values should be sacrificed. It isn't in the public interest to tie up good growing sites that could provide a perpetual crop of timber and support the region's economy." Sumanik points out that his concern is with access, not logging. If the trees could be logged without pushing a road through the canyon, he'd have no objections.

Debates such as these probably wouldn't be taking place at all if there were ample forest land available to all forest users in the Nelson area, but there isn't. Most significantly, the forest industry's timber supply is shrinking, and not only because of timberland being given over to dams, parks, farms and Hydro lines. Damages from fires, insects and pests, especially in the drier East Kootenays, have greatly reduced the volume and value of millions of cubic metres of forest. As well, a variety of designated environmental protection areas (mainly steep slopes with bad soil slippage problems) have reduced the annual tree harvests in some areas by as much as 20 per cent.

When the Allowable Annual Cut (the Ministry of Forests' limit on the volume of timber that can be cut each year to ensure long-term forest productivity) was last fixed for the region a decade ago, these reductions in the timber supply were often underestimated. The industry's timber harvesting quotas were based on an optimistic projection of the region's timber resources, and the industry, in turn, has expanded to utilize its quotas fully. The result is an industry demand for logs which is greater than the allowable supply — what is called an overcommitment. "There are places in the region where licencees have the privilege of cutting more than the area can sustain," explains John Cuthbert, Forestry Manager for the Ministry of Forests Nelson Forest Region. Adding to the problem are the difficulties sometimes encountered in forecasting long-range timber supplies. For example, there's been a lively debate about just how much timber is left in the Creston area. A local forest industry group maintains that there is a supply of merchantable timber sufficient for the forseeable future given the current rate of harvest; an all-users group claims that only six years' worth of merchantable timber remains if all other forest values are considered.

With so much uncertainty about the future, the pressure is on the industry to maintain its supply of timber. But with less and less mature timber available to be logged, even in remote areas (and with fewer and fewer remote areas available at all), operators are forced to look closer to home for their logs — often in some community's back yard. Here they face a large obstacle: water users who jealously guard their water supplies, and who view critically the industry's environmental record in logging watersheds.

In the Kootenays, scattered rural residents and small communities pipe their water from numerous surface creeks which tumble off the mountain slopes. The thousand-odd residents of the Blewett were more than a bit upset four years ago when Crestbrook Forest Industries first revealed its intention to log the timber above their homes and farms. "I thought it would be the desecration of our water," recalls Wilbert Anderson, a farmer in the area for 40 years.

At a public meeting in March 1976, several hundred Blewett residents expressed angry doubts, some threatening roadblocks and other acts of civil disobedience if the plan to log went through. Meanwhile, Bruce Fraser, a nine-year Blewett resident and biology instructor at Selkirk College in Castlegar, was working on another tack. As chairman of the stormy meeting, Fraser asked the company if it would be willing to involve the community in planning the logging operation. The company was all for it. The Blewett Water Users Committee formed at the meeting soon started negotiating with the company, as well as with the Ministry of Forests' regional office, the Fish and Wildlife Branch and the Water Rights Branch, to ensure that logging wouldn't affect their water supply.

The residents' biggest concern was for the protection of the three main

Probably the biggest land-use battle of the 1970s in the Kootenays was over what is now called the Purcell Wilderness Conservancy, a large alpine tract northeast of Nelson. The boundary lines of the park today block a key logging access route up Fry Creek canyon (above), and debate still continues over this point. On one hand is the need to both protect the creek from the inevitable damage that would occur from road construction, and to preserve what real wilderness is left in the Kootenays; on the other hand, the lack of a logging road prevents the forest industry from having access to valuable timber supplies.

The cooperative planning approach to logging in the Blewett watershed resulted in such refined forestry practices as the isolated selective logging operation appearing in the centre of the top photograph. Here some of the best trees were left standing to serve as seed trees for future forest crops. Similar selective logging activity is being carried out in the Slocan Valley by local loggers such as Alf Anderson (above).

During construction of the road above Rover Creek (opposite page top left) great care was taken not to pollute the creek. Once completed (opposite page top right), the road opened up the Blewett area for recreation.

creeks draining the slope. "If you look around the Kootenays," Fraser claims, "you'll see a large number of watersheds running brown at freshet time. In many cases that can be attributed directly to bad road building, bad skid road construction or bad hauling techniques."

The industry's record on steep-slope logging is not outstanding. "This region has been slow to develop new logging systems," says forestry manager John Cuthbert. "Cats and skidders are still prevalent. They require skid roads which disturb the ground and remove a lot from future forest production." And Crestbrook's woodlands vice-president John Murray admits: "There are any number of bad examples in the Kootenays of logging in watersheds."

Crestbrook went more than half way to meet the Blewett residents' demands. Bruce Fraser comments: "They made sure the haul route was properly laid out to avoid populated areas. They hired a full-time supervisor, Joe Tress, to make sure that the local contractors were following the plans. They also promised compensation for any damages to the residents' water supplies, and set up an agency to adjudicate any claims."

The most time-consuming and expensive element in the Blewett logging plan was the harvesting schedule. The committee insisted that logging be planned according to a resource folio which catalogues every nuance of the landscape — almost every bird in every tree. This ecological approach led to the decision to selectively log the fir and larch on the lower slopes, and to clearcut small patches in the higher spruce-balsam forest. Here, careful attention was to be paid to both the size and location of each clearcut block.

All told, it took Crestbrook Forest Industries, the Blewett Water Users' Committee and the Ministry of Forests just over three years to complete the negotiating, planning and road building for the relatively small logging operation (about 30,000 cubic metres a year) on the Blewett slope.

"The Blewett is a model for the province," says assistant ranger John Gray, who isn't alone in thinking that this cooperative approach to multiple-use planning can be widely adapted provincially. But Crestbrook's supervisor Joe Tress sounds a note of caution: "If this works, we're in good shape; if not, we're in trouble." Bruce Fraser is guardedly optimistic. "It will be a big turnaround in thinking if the rest of the industry follows Crestbrook's lead," he says. But even if the industry can be convinced of the merits of involving local communities in multiple-use planning, the communities themselves have to organize into unified working committees to be able to participate in the planning process.

A number of complex land-use issues are developing in the Nelson area which will test the cooperative spirit of multiple-use planning developed around the Blewett. In the Creston area, for example, Crestbrook Forest Industries, Kootenay Forest Products and several other companies want to cut timber; the Fish and Wildlife Branch is protecting a caribou migrating corridor; a brewery and an agricultural business insist on clear water; and recreationists want to have the Skelley and Goat River drainages protected. Ministry zone forester Hubert Nyst in Nelson says: "We hope the Creston Public Advisory Committee [a standing body of about 15 members representing all land users in the area] can resolve all the conflicts and come up with a consensus proposal to guide the Ministry's final decisions."

In the inevitable give-and-take, "nobody gets exactly what they want," notes regional manager Isenor. John Cuthbert adds: "You maximize timber use at the expense of water quality or some other value, and vice versa." There will be no miracles of loaves and fishes to satisfy all the users of the Kootenays' resources.

The forest industry in general ap-

pears to be interested in multiple-use, and anxious to demonstrate its good faith to the Kootenays' other forest users. As an example, logging methods, a major cause for environmental concern in the Nelson area, are changing. "We plan most operations more intensively now, to relate logging systems to the terrain," says Crestbrook's John Murray. As well, there is a developing trend towards better logging practices and towards the use of such machinery as the FMC forwarder, a light flotation skidder which doesn't require forest trails, and the use of high-lead towers for skidless logging on steep slopes. Kootenay Forest Products' Wayne Morrison, an enthusiastic multiple-use backer, maintains that new logging technology can be used close to wilderness areas," and no-one is even aware you've been logging."

In a few years' time, however, the industry may be reluctant to share valuable timber lands with other users when merchantable timber becomes in short supply. "This region has come to the timber supply crunch sooner than the rest of the province," says regional manager Maurie Isenor. Logging decadent wet-belt cedar can partly make up for anticipated shortages of mature timber in the West Kootenays. The East Kootenays have no such reserves, and the fast-spreading mountain pine beetle epidemic has become a very serious problem. Most logging operators have been forced to concentrate on salvaging infested lodgepole pine stands, and this beetle damage may upset future rates of harvest.

Down the road, the industry will have to start cutting smaller-diameter trees. This will require an eventual change in sawmill design to adapt to the smaller timber, an investment the industry views with little relish. But modifications are underway: "We're doing our damnedest to redesign our plant," says Kootenay Forest Products Jack Sigalet, "to produce lumber and chips from decadent hemlock and cedar." Even so, in some parts of the Nelson Region, forestry manager Cuthbert warns: "After the current timber supply analysis is complete, we may have to cut back our timber allocations significantly in some areas. The longer we continue overcutting our timber, the more we're depleting our future resources."

Given the pressures of a timber supply squeeze in the Kootenays can a good idea like multiple-use survive? Or will other forest users' needs take a back seat to the industry's need for logs? That's for the Kootenay's many forest users to work out among themselves, and it will likely take many experiments such as the Blewett project before the question is resolved. With so many contending forces in the Kootenays, and with such widespread interest in land-use issues, multiple-use seems to be the surest path to a compromise.

The success of multiple-use planning in the Blewett watershed could serve as a model for the rest of the Kootenays so that hikers can have their wilderness** (above), **hunters their game, tourists their vistas and the forest industry its timber, all from the same land base.

The Living Leaf

by Gary and Judy Green

Spring comes to the forest. The bare deciduous trees are soon dressed in a fresh covering of green as their leaves burst from protective buds. Plant communities at the base of the trees raise their leaves towards the sun, the single source of all life's energy.

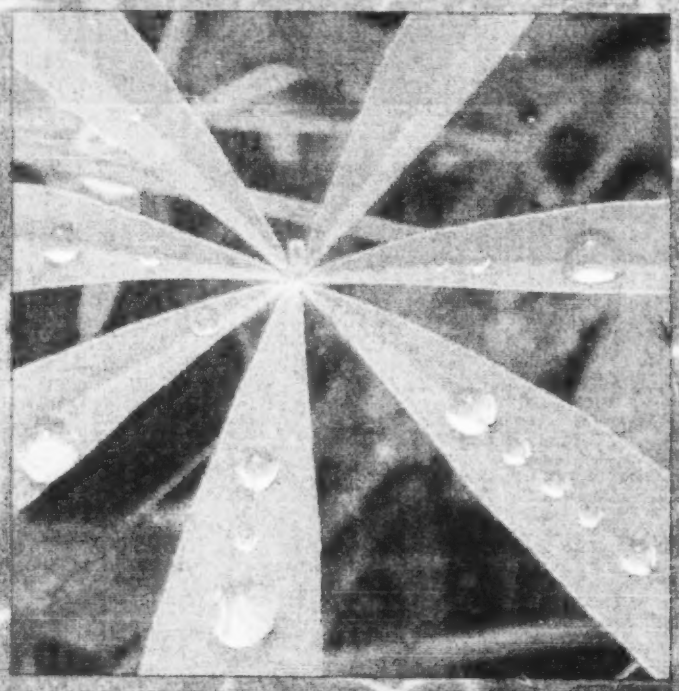
The leaf is the heart of the food chain. Within the cells of the leaf the miraculous event of photosynthesis occurs — the conversion of sunlight, carbon dioxide from the air, and water into sugar molecules. Thus, the raw energy of the sun is stored in the leaf as chemical energy, to be passed on to other life forms feeding on the leaf.

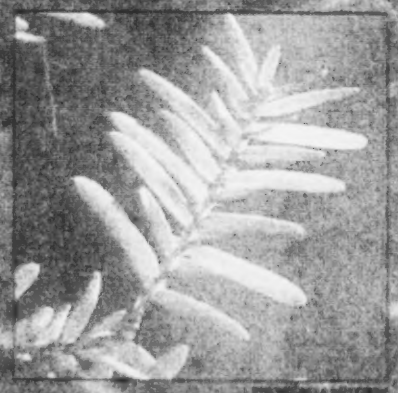
Photosynthesis is made possible because of the amazing compound, chlorophyll, which is contained within the leaf's cell structure. Sunlight probing the forest cover strikes the chlorophyll, causing its molecules to become energized. Agitated electrons cause water contained in the leaf to split into its component parts of hydrogen and oxygen. It is from this reaction that sugar emerges, the foundation on which all components of life are constructed.

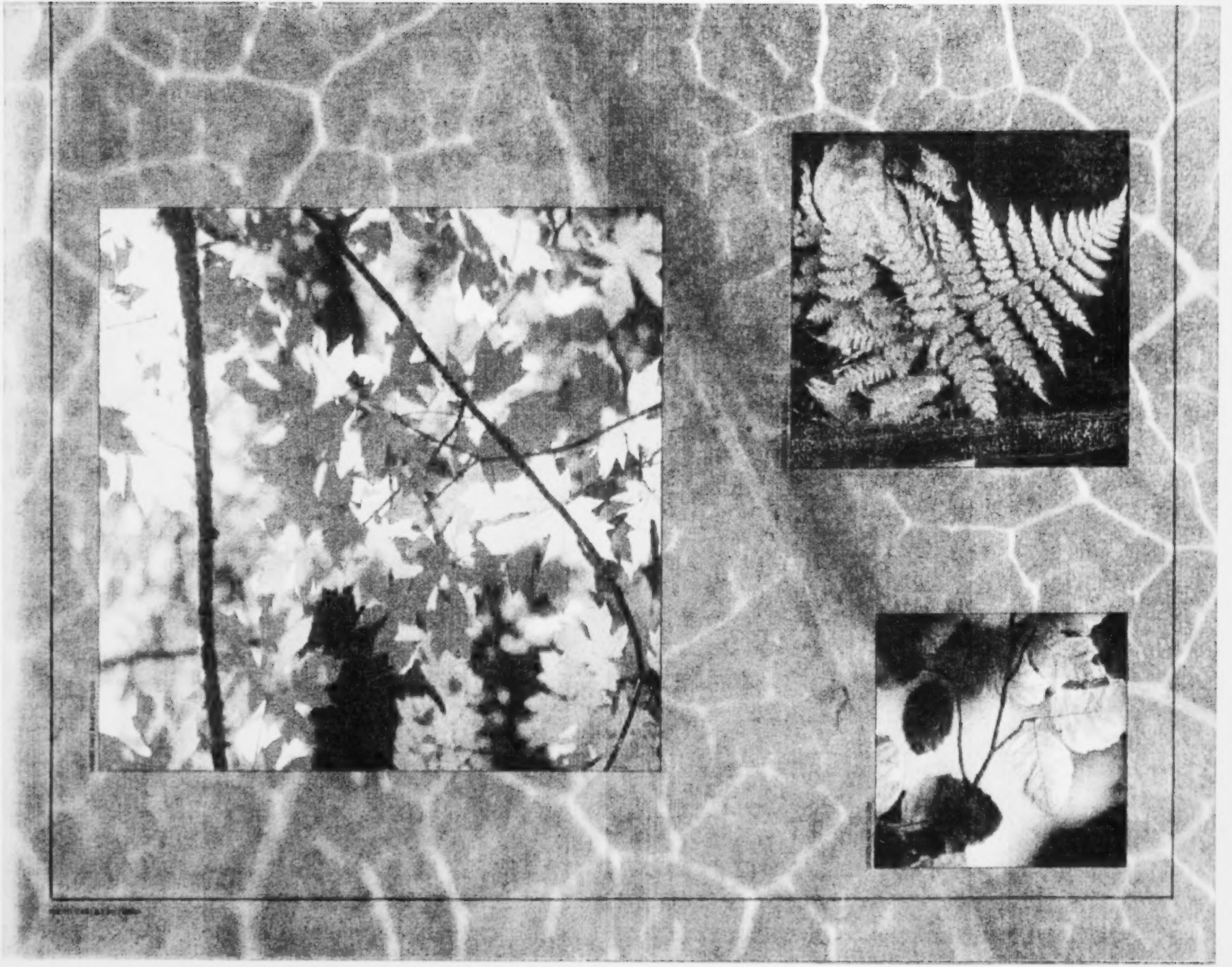
Oxygen is the by-product of photosynthesis. The existence of animal life depends on this oxygen; plant life requires the carbon dioxide from animals. In this way is the balance of life on earth maintained.

The energy used by plants and animals represents sunlight energy entrapped in sugar molecules during photosynthesis. Over millions of years, this energy has, in turn, been entrapped in the ground in the form of fossil fuels such as coal and oil.

The simple leaf, so varied in design, forms the bond of water, air and sun so that we may live.







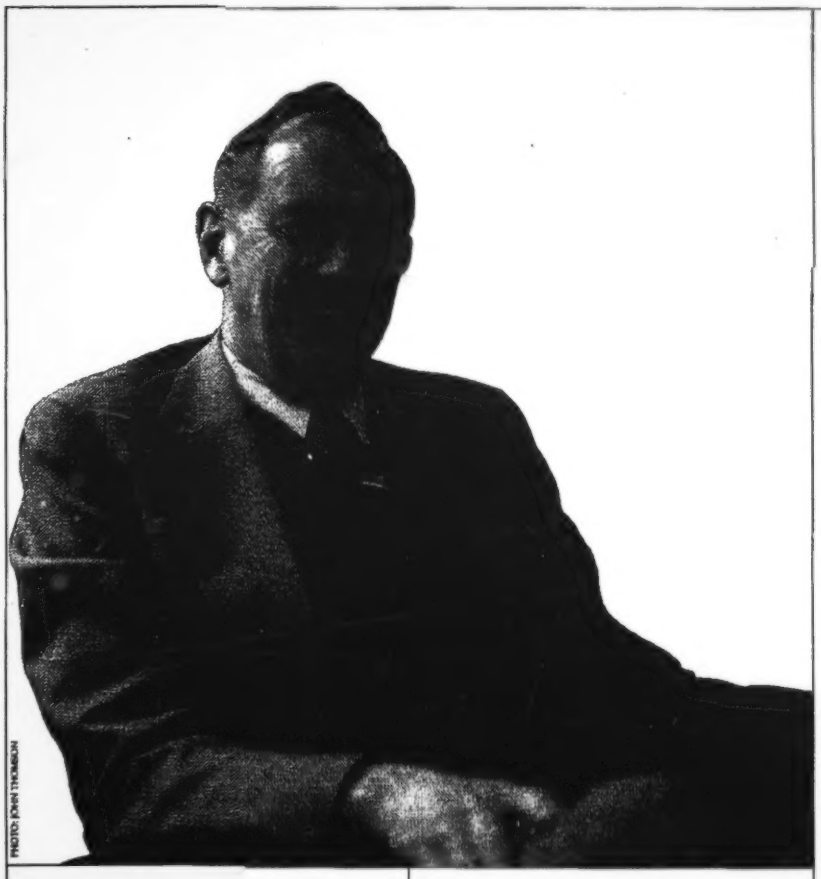


PHOTO: JOHN THOMSON

ForesTalk
Interviews

Dr. Ian McTaggart-Cowan

by **Jack Danylchuk**

Equally at home in the forest or boardroom, rain gear or academic gown, Dr. Ian McTaggart-Cowan combines both scholarship and dedication to conservation.

Raised in British Columbia and educated at U.B.C. and the University of California at Berkeley, McTaggart-Cowan has established a national and international reputation as a researcher, advisor to business and government, and an active participant in wildlife conservation. Titles, honours, a lengthy publications list — all testify to his lifelong dedication to learning and the natural world.

Chairman of the Academic Council of British Columbia and the Canadian Advisory Council on Whales and Whaling, and Chancellor of the University of Victoria, McTaggart-Cowan recently was named honorary president of the Federation of British Columbia Naturalists. The National Wildlife Federation of the United States named him International Conservationist of the Year in 1978.

Throughout his career, McTaggart-Cowan has displayed an ability to understand both sides of the development-conservation question. As he points out in this interview with ForesTalk, resource development, including logging, is necessary — not a necessary evil. But development must be balanced with conservation, or, in his words: "Wise use."

FORESTALK: Let's define some terms at the outset. What do you mean when you speak of the environment?

MCTAGGART-COWAN: The environment, in the context we are speaking of, is all the conditions under which animals live: geography, geology, climate, water, vegetation, and other animal species — all those things that tend to make one area different from another in its ability to support life. When you get closer to it, you have to talk about species, because different animals have evolved to make use of different kinds of environments. Up near the timber line and rock slides, you're going to find pack rats and rock rabbits — picas. When you get into subalpine timber, with grass, flowering plants and deciduous vegetation, there will be another group of animals.

FORESTALK: Is there any ideal wildlife habitat?

MCTAGGART-COWAN: Most forms of wildlife prosper best in mixed circumstances — what we call the edge effect. They can move from one kind of habitat to another with the seasons, and put the whole thing together in a food web.

FORESTALK: You are an active hunter and angler. How do you describe conservation?

MCTAGGART-COWAN: I regard conservation as wise use.

FORESTALK: There are conservationists who oppose hunting or fishing and suggest that nothing in the natural world should be touched.

MCTAGGART-COWAN: I think those are extremes that are forced on people. Frankly, though I wouldn't be party to the viewpoint of extremists, I have frequently appreciated the fact that they were there. They made my negotiations easier — I appeared reasonable by comparison.

FORESTALK: You are quoted as saying that we have witnessed the destruction of the environment through insignificant increments. Could you elaborate?

MCTAGGART-COWAN: This is one of the most important things we have discovered. Development is imposed on an environment in stages. If you make decisions on whether each separate change is going to be important, you are apt to say: "No, that's not important — let

it go." But when you look back 10 years later, you'll probably see that each little change had its own impact. The total consequence is destruction of the environment, although each separate act appeared insignificant.

FORESTALK: What example comes to mind?

MCTAGGART-COWAN: Well, the Fraser River Delta. A developer comes along and he's got some wet land. He wants to fill it in for a shopping plaza and there's an awful lot of wetland in the delta — no problem. So the sockeye salmon fry lose five acres. What's five acres when you have one hundred thousand? But this pattern is repeated many times: A new area is dyked off, another receives a small sewer outfall, a log storage area is developed, and so on. The total results are the destruction of the biological support value of the delta.

"The assumption is always that when you develop land the wildlife goes elsewhere, but there isn't any 'elsewhere'."

The assumption is always that when you develop land the wildlife goes elsewhere, but there isn't any "elsewhere." All the "elsewheres" are already full, and if you take out a few acres you are permanently removing the creatures that live there. That's what is meant by destruction by insignificant increments.

FORESTALK: Is there any mechanism that would, if not erase what has gone before, at least alter the process?

MCTAGGART-COWAN: You have to bring people together. You have to try and determine what are the minimum needs for maintaining a variety of useful purposes. You might decide collectively that the industrial interests are so paramount that the fishery resource can be wiped out on an individual river. That's been done many times. To many people that is extremely short-sighted, because well-managed biological resources will go on indefinitely, whereas industrial uses come and go.

FORESTALK: A great deal of concern has been expressed in recent years over the future of river estuaries.

MCTAGGART-COWAN: Estuaries are a doorway to everything a river is. If you consider the value of the sockeye salmon spawning areas, the most valuable land in North America could be the Adams River spawning beds, not the corner of Yonge and Bloor in Toronto. But what do you do when someone wants to build a summer cabin on the river bank?

FORESTALK: What is the harm in building a cabin on a river bank?

MCTAGGART-COWAN: That one cabin isn't necessarily a problem. But suppose the cabin is replaced with a retirement home with a dishwasher and lawns and a septic field. Then five years later the house is replaced by a motel, and 50 other people do the same thing on adjacent lots. Step by step the river is threatened, and all of a sudden it all looks quite stupid.

PHOTO: JOHN THOMSON

FORESTALK: In the past, not many conditions have been attached to land use.

MCTAGGART-COWAN: We haven't put conditions in, and that is what most conservationists are striving for — to set conditions for development. Most conservationists are not against development. They know very well that we live on our resources. Every animal uses its resources, and man has developed a greater capacity and variety of ways for using resources than have other animals. That's not the issue. It is how the resources are used. And that includes no development on some areas which are essential to maintain another resource.

FORESTALK: Man has a capacity few other animals possess — to significantly alter our environment.

MCTAGGART-COWAN: We also have the capacity to predetermine the way it's going to be altered. We don't have to just keep looking back to see what happened. That's what impact assessment is all about.

FORESTALK: What impact does logging have on the environment?

MCTAGGART-COWAN: There are a number of things about logging that have always interested me. It's highly site-specific so far as its impact on wildlife and fisheries are concerned. There is no doubt that the removal of timber in some forest types has produced a kind of habitat that is much more suitable for blacktail deer than was the primitive forest. But as logging moved higher up the slopes and clearcutting followed by fire was the accepted practice, huge areas became uninhabitable during heavy snow periods, and the deer were sometimes prevented from reaching safe winter range.

Newer logging techniques which create leave-strips between higher and lower elevations, while they also result in a lot of open ground, do maintain corridors through which the deer can move to more suitable wintering areas.

Other types of forest, such as the mature spruce forest in the Selkirks and northern mountainous areas, are essential winter range for caribou. The caribou make heavy use of the bear "moss" that hangs from the branches. To log this forest is to eliminate the caribou.

FORESTALK: But if it comes down to deciding whether to manage a forest for its timber or its wildlife, economic pressures will always sway the decision in favour of logging?

"I don't think there is any doubt that the kind of forestry practised on large parts of Vancouver Island 15 or 20 years ago had a lot to do with the collapse of the coho salmon."

MCTAGGART-COWAN: Not necessarily. I did a study of the spruce forests in the Fort Nelson area. My estimate was that, over a hundred-year cycle, the forests were worth more for their furs than their trees.

FORESTALK: Then we are looking

at different uses for different kinds of forests?

MCTAGGART-COWAN: Yes, but that doesn't mean I'm not interested in forest production. It would be ridiculous for any British Columbian to try to opt out of the forest business.

FORESTALK: You've dealt with the effect of logging on forest wildlife; what of its effect on fish?

MCTAGGART-COWAN: I don't think there is any doubt that the kind of forestry practised on large parts of Vancouver Island 15 or 20 years ago had a lot to do with the collapse of the coho salmon. Forest removal led to multitudes of small streams experiencing violent spring runoffs, followed by their drying up in the summer. It was pretty sloppy management; unfortunately, it still persists in some areas — witness the Queen Charlotte Island practices and the present controversy there.

FORESTALK: There are few stands of old-growth timber left in B.C. Is there any value in maintaining those forests?

MCTAGGART-COWAN: Yes, this land has a social as well as a cash value. Over-maturity is a logger's term, not a biological term. Forests go through normal cycles of growth and decadence. As they go through these stages they are used by different creatures in different ways.

I think we should have substantial areas of forest that will serve as examples of what a forest is, and how it is evolving, so that we can learn to do a better job of managing those forests we're using for other purposes. Sheer personal enjoyment of an unspoiled area of nature has value, even if it can't be sold. If these areas are logged there won't be that form of beauty for another 400 years. But the logging companies can't afford to wait that long to harvest the next crop. So cutting very old timber is much like mining. Once it is done, that form of the forest will not occur again.

FORESTALK: Besides logging itself, logging roads also affect wilderness and wildlife habitat?

MCTAGGART-COWAN: The most important effect is greatly increased access. The area of hinterland where wildlife cannot be assaulted by hunters or panicked by snowmobilers gets smaller and smaller. Increased access through logging and mining roads has resulted in a steady decline in several species of wildlife.

FORESTALK: Once logging roads have opened, the public has access to areas previously closed to anyone but hikers or horsemen.

MCTAGGART-COWAN: If you want to see a really sad state of affairs, go to the country northwest of

PHOTO: JOHN THOMSON

Kamloops. You can go 30 miles on old logging and mining roads. Within the first five miles are a lot of hills that appear to have been left by glacial action — mini mountains. Almost every mound has been torn to shreds by motorcyclists. This kind of damage by off-road vehicles is widespread.

"One of the problems of being a conservationist is that you can win over and over again, but you only have to lose once and the ball game is over. Extinction is forever."

FORESTALK: Is that the problem? Does the public perceive the landscape and environment as an enemy to be conquered?

MCTAGGART-COWAN: I think that idea has pretty well disappeared. That certainly was the whole concept of the westward march of European civilization in North America. I don't think it exists anymore. This is something different; something in man that responds to power. I'm sure we all recognize it. Still, this is a pluralistic society, and people have the right to own recreation vehicles and use them.

FORESTALK: What would you propose as a solution?

MCTAGGART-COWAN: The answer probably is that we should have areas where off-road vehicles can be used, and large areas from which they are excluded, just as I think we should have lakes in the hinterland on which it is forbidden to land aircraft except in an emergency.

FORESTALK: British Columbia is well launched into an era of multiple resource use. What effect has this concept had on conservation efforts?

MCTAGGART-COWAN: All sorts of things are being done which make it possible for a variety of groups to gain benefit from the same parcel of land at the same time, or sequentially. Where logging is involved, a large part of that land will be an eyesore over certain periods of its management cycle. Some people resent that fact, others are prepared to say that that is part of the business of man's use of his resources. Still, there are a number of logging techniques, such as retaining some forest cover on game winter ranges, or leaving forest corridors between high and low forests, which can assure some multiple-use values.

FORESTALK: Then what we are striving for is a balance between economic and aesthetic, or spiritual, needs?

MCTAGGART-COWAN: We have different ideas in our society about what constitutes wise land use. We elect people to make these kinds of decisions, but I think citizens can participate in the decision-making of governments — as members of advisory committees or conservation organizations, by writing their parliamentarians when they feel the urgency to do so. We should do more of it.

FORESTALK: Is that what brought about greater recognition of the need for conservation — public pressure?

MCTAGGART-COWAN: Yes, I really think it is. People have become more adept at expressing themselves, and they have learned to organize themselves into local, national and international organizations which are large enough and sophisticated enough to command attention.

One of the problems of being a conservationist is that you can win over and over again, but you only have to lose once and the ball game is over. Extinction is forever.

A spotter plane patrols the landscape in search of forest fires. Flames are sighted, and the call goes in for . . .

RAPATTACK

story and photography by **Doug Cowell**

The tinder-dry hills east of the Okanagan Valley are in the midst of what will prove to be the second worst fire season (1979) in British Columbia's history. The previous night, remote sensing instruments had reported a lightning storm in the area, and as the pilot banks sharply he finds what he's looking for. An ugly grey column of smoke climbs lazily skyward; at its base a patch of pine trees and brush is in flames. With a long, hot afternoon ahead and thousands of hectares of forest threatened, the pilot knows this could be a bad one. He flicks the transmit button on his radio.

Twenty-six minutes later the valley echoes with the roar of two A-26 airtankers led by a bird-dog aircraft. They drop their bright orange fire retardant and pull out of the drop run. The fire retardant won't put out the blaze, but it has cooled things down for awhile.

Before the tankers are out of sight, a Bell 206 helicopter, with a strange orange bag slung beneath it, eases into a low hover near the fire. Twenty-two year-old Paul Hooper leans out the open door, guiding the pilot into position through the intercom built into his crash helmet.

A hundred-metre length of nylon rope, uncoiling as it falls, plummets to the ground as Tom Von Hahn gets ready to exit. The rope runs through a special device called a "Sky Genie" and up to a special anchor on the outside of the helicopter just above his head. On a signal from Hooper he smoothly backs onto the helicopter skid, pauses for a quick last check, then with the aid of the Sky Genie, begins a controlled descent to the forest below. In ten seconds he's on the ground and scrambling to unhook from the rope so that his partner, Don McMillan, can follow. The teardrop-shaped equipment bag drops down the same rope and moments later the chopper is gone. With the rappelling maneuver completed, the crew gets down to work.

A chainsaw coughs into life and trees begin toppling. McMillan clears a flat area for a helicopter to land on, then begins opening an approach path through the trees. Tom Von Hahn moves debris away from the landing site, and, working quickly, levels the ground roughly with a shovel. Then the two men dash to the leading edge of the fire and begin working to control it: digging ditches, tossing dirt, cutting firebreaks.

When the helicopter returns nearly an hour later it lands gingerly on the newly constructed helispot. The first crew of firefighters unloads while Don and Tom scramble aboard. The time is 1:20 p.m., just over an hour since the fire was first spotted. With a fire suppression crew on hand, the fire will soon be under control. The two rappellers from the Ministry of Forests' Rapattack crew are on their way back to base to get ready for another fire.

Rappelling is a technique developed by mountaineers to slide quickly down a rope. Originally the friction required to control the descent was gained by wrapping the rope around the body, but recently various metal rappelling devices, including the Sky Genie, have been developed to take some of the wear and tear out of this physically taxing exercise. The Sky Genie consists of a main weight-bearing casting, around which the rope is wrapped; an outer cover keeps the rope in place. The rappeller has only to vary the tension of the rope feeding into the Genie to control his rate of descent.

Rappelling out of helicopters was first developed by military forces to put troops on the ground in otherwise inaccessible areas. Its firefighting application was first used in B.C. by International Fire Fighting Systems, a private firm which the Ministry of Forests began working with six years ago. But the Ministry really didn't get involved in rappelling in a big way until the day Jim Dunlop's crew had to walk for over four hours to reach a fire.

"That's when I began thinking about helicopter rappelling, when it took that long to reach the fire from the closest place a helicopter could set down. The fire took off and cost $80,000 to put out. If we'd arrived there sooner it would have cost maybe $2,500."

At the time, Dunlop was the Forest Ranger for the Lower Post Ranger District. His territory in northwestern B.C. covered a land four times the size of Vancouver Island, and one of his main responsibilities was fighting fires.

Dunlop methodically researched everything available on the technique and eventually took rappel training himself. He and his staff went on to write training and safety manuals for the operation, which have since become the official Ministry texts on the subject. In 1977 he began rappelling into fires with a crew of three. In 1978 he had a six-man crew, and by 1979 the Lower Post Ranger District was fighting fires with 12 men organized into four teams of three rappellers each. Along the way, when the crew were looking for something distinctive to call themselves, one member came up with "Rapattack." It soon caught on.

Dunlop chooses his teams carefully, looking for healthy, robust individuals who can get along in groups and work well under pressure. For the 12-man crew he interviewed over 300 applicants from technical institutes and colleges in the lower mainland.

"My interviewing techniques are maybe unconventional," Dunlop explains, "but I've got to loosen the guys up so they'll show me who they really are. One time when a university supervisor came past my interview room, he found three of us crouching on chairs on top of the table with me waving my arms about. I was demonstrating helicopter procedures."

Training begins in early May flat on the ground. For two long hours every day the men do exercises, weight training and running. Each man is taught how to design a fitness program for himself and is expected to be in top physical condition throughout the season.

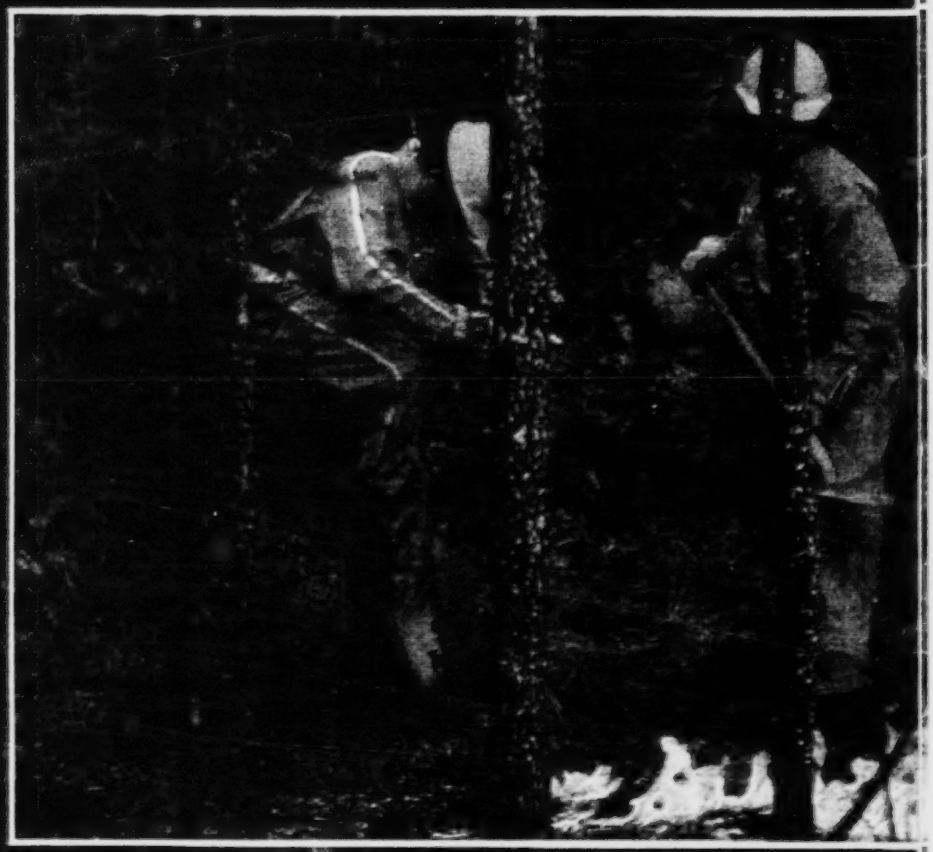
For 20 gruelling days they plow through lectures and slideshows; get their hands greasy with chainsaw practice; learn the thrill of felling trees and the discipline of doing it safely. They study first-aid and survival techniques and sweat through firefighting practice with real fires. There are even speed drills for getting into their gear — boots and coveralls, harnesses and crash helmets. Throughout the season they have to be able to maintain a seven-minute reaction time from the time a fire call comes in to takeoff. And always, endlessly, there are the essential helicopter and rappelling drills. Each man has to do one hundred rappels from the big log training tower before he even gets close to a helicopter.

Once the rappellers get to exit from a hovering helicopter they must learn to stay as close as possible to the machine's centre of gravity, move down the rope quickly and safely, and do everything smoothly, very smoothly. This smoothness only comes with practice, and the rappellers understand that the discipline and rigorous training is for their own safety.

For its first two years the Rapattack program was limited to the northern reaches of B.C., where distances are great, road access almost nonexistent, and the population base from which to draw firefighters minuscule. In early July of last year, however, when the north country was safely soggy but the southern

As soon as a spotter plane locates a fire (page 21) the pilot radios in its location. The Rapattack crew scramble into their gear and race to a waiting helicopter. When they reach the vicinity of the fire the rappellers carefully lower themselves and their equipment to the ground (opposite page).

Depending on the circumstances, they either will begin to fight the fire themselves, or rapidly construct a helicopter landing spot. This allows the helicopter to return and land with a crew of conventional firefighters. The use of rappellers in fire-fighting means that fires are reached quickly and contained before they have a chance to spread and consume millions of dollars worth of timber.



One sharp pull on the cord and rappeller Bruce Alexander (top and bottom) has his chainsaw running. Rappellers not only must be able to drop close to forest fires from a hovering helicopter, they must know the discipline and safety of working with chainsaws, be able to carve out helispots in thick forest, know first-aid and wilderness survival, and be able to judge a fire and apply the appropriate fire-fighting techniques (top right). All this takes training, and lots of it.

part of the province was tinder dry, a call for help came into Lower Post from Penticton. A lightning storm had passed through the Okanagan area leaving behind a rash of isolated fires. They had to be reached quickly, before they spread; a job made to order for rappellers.

The next morning, 1,300 kilometres south, four Rapattack rappelling teams were at work in the Penticton area. Here, their specialized skills were best suited to dropping down close to a fire and carving out a helicopter landing spot so conventional firefighting crews could follow closely behind. The rappelling teams were kept busy moving from one fire to another, creating almost instant access to fires that otherwise might not have been reached for days.

As it turned out, the Rapattack crews spent most of the summer in the critical fire areas of southern B.C. while their home district to the north remained damp and safe. At the same time, a 12-man rappel crew on contract to the Ministry from SALIX Resources Ltd., a private firm, was based in Revelstoke and available to both Kamloops and Nelson regions. It

was an exhausting summer for all of B.C.'s firefighters. Over 3,800 fires were reported, and the Ministry of Forests' direct fire suppression costs soared to a record estimated figure of $21.3 million.

Hank Doerksen, the Ministry's Victoria-based Manager of Forest Fire Suppression, puts the Rapattack operation in a provincial perspective: "Rappelling is one more good technique for fire control, like air tankers and bulldozers. It's one more technique you can use, but its usefulness is gaining more recognition all the time. We're considering enlarging the rappelling program and we may base crews in most forest regions of the province. Then, as with the air tankers, we'll put them on what I call a provincial concept. Each region may have its own crew, but when the fire-danger rating in that region is low, that crew gets pulled into an area where the danger rating is higher."

One of the tasks of the Rapattack crew last summer was to test out this idea of working as a mobile unit; to learn how to operate in the varying terrain and forest types in the province. Moving about the province in commercial aircraft, living in motels or tents, the rappellers worked out of Seymour Arm, Blue River, Kamloops, Penticton and Salmon Arm.

And how well did the Rapattack crew fare in this test? "Sure, there were details to work out in becoming a mobile crew," admits Rapattack leader Jim Dunlop. "People didn't know what rappellers could do and the various regions had to get used to using them.

"I may be biased, but I think rappelling is the best tool for handling lightning strikes and initial fire attacks since the introduction of air tankers. The crew did more than I had thought they were capable of. Young guys who had never had that kind of experience felled big trees and built helispots on almost sheer rock faces. You couldn't have asked for a better performance."

The rappellers approached their work eagerly, and although they survived the season without a serious mishap, rappeller Siggi Kemmler, a forestry student at Malaspina College, remembers one particular close call:

"We were building a helispot on the Dan Fire near Seymour Arm. It was early afternoon and the forest was really dry. A hot spot flared up and suddenly we had to run for it. We had a pre-planned escape route to the lake, but the wind showered down embers and spot fires were lighting up all over the place. We got right into the water and sloshed half a mile down the lake to where we could build a quick helispot and get out. Earlier, over the radio, we'd heard about the seven firefighters in Ontario who died when they were trapped by a fire, so we were scared. We really moved."

Dunlop has a different story to tell, this one dating back to the 1978 fire season:

"That year we didn't always have a helicopter immediately available. Once, when a fire call came in, we had to wait for a machine. So we lost our particular effectiveness, which is speed of attack. If we'd arrived there sooner we could have handled the fire with just two rappellers. But it got away and burned up a bunch of good timber. Putting it out cost a million dollars."

You can do a lot of rappelling for a million dollars. ◘

Fire Watch

During the fire season, when the lightning gods seem to be picking on B.C. and fire reports are flooding in from around the province, a provincial duty-officer desk is set up in Victoria. From here, the duty-officer can keep track of what's happening province-wide and move his resources accordingly. One weekend last summer, for instance, over 300 lightning fires were reported. Rappellers, air tankers, helicopters, and whatever else was needed were rushed into trouble spots without leaving other dangerous areas unprotected.

If things get really bad and local firefighting equipment runs out, a call is put in to the regional equipment cache. Each regional cache can outfit 1,000 to 1,500 firefighters. If more than that is needed, the provincial cache at the Ministry of Forests marine depot in West Vancouver can equip another 2,000. On top of that, every logging operation is required to keep firefighting equipment on hand, and there's also reciprocal firefighting agreements with other provinces. There are even agreements with neighboring U.S. states, and the American national cache in Boise, Idaho is also available.

People

Toke Meeker

by Dorio Lucich

They call him "The Shake King" — a tribute to his pioneering efforts in the shake and shingle business. In fact, it wouldn't be an exaggeration to say that Toke Meeker literally invented the market for cedar shingles and shakes.

PHOTO DORIO LUCICH

Townsend B. Meeker of Mission, B.C. introduces himself with a sparkle in his eyes as "Toke"; friends in the shake and shingle business call him "The Godfather"; and throughout the cedar logging industry he is known simply as "The Shake King" — nicknames he earned while building one of the world's most successful cedar shake and shingle marketing operations. In fact, it would be no exaggeration to say that he literally invented the market for cedar shingles and shakes. Toke accomplished this through incredibly hard work, continuing commitment, and incessant travel throughout Canada, the U.S. and the world over a period of 30 years.

At 65, Toke is supposedly semi-retired, but he still likes to "keep his hand in the game," especially since his sons are all in the business in one way or another, a business which he is quick to point out had its origins back in his father's time. "It didn't start with me. My father, Henry C. Meeker, started it all when he began operating a small lumber mill in Merritt in 1906." Toke worked for his father in various capacities and locations. Finally he and his brother, Lincoln, started up their own shingle mill at Mission on the Fraser River.

In 1938, Toke married Thelma Barnes of Pitt Meadows, and the growth of his mill operations in Mission was matched by the growth of his family. In the ensuing years the Meekers had six sons: Mike, now 40; John, 39; Clayton, 33; twins Justin and Quentin, 29; and Brad, 22.

By 1942, Toke and Lincoln had begun to differ over the future in the cedar shake business, so Toke bought out his brother and went ahead on his own. With his company, Meeker Cedar Products, Toke decided to pursue his interest in handsplit cedar shakes and the possibilities of building a market for this product.

Until then the demand had been for 18-inch "perfection" shingles, but the war had brought about a shortage of

manpower and shingles were in short supply. Toke knew an alternative had to be developed. He invented a handsplit shake — the 18-inch straight split with a three-eighth-inch thickness — and shipped thousands of carloads of them to the U.S. market from the CP rail siding at Mission. Throughout the war Toke had hundreds of small contractors turning out these handsplit straight-18's, working in any area of the Fraser Valley that contained cedar timber.

Toke then went on to devise the pack (still used today) to market shakes more easily. The shakes are piled into bundles, with four or five bundles making up a square. The squares are then piled into flats for easy loading and unloading onto trucks or railcars.

As the war drew to a close Toke invented another shake, one that would lie flat and tight, much like a sawn shingle. His subsequent marketing efforts made this a popular item in the U.S. As his business prospered, Toke began to realize that he would have to look further afield than the Fraser Valley for his supply of cedar trees. Over the next few years he struck up salvage contracts and timber deals with nearly every large forest products company logging anywhere in the province. Wherever cedar grew, Toke was there trying to get a viable cedar shake operation underway.

But Toke still wasn't finished inventing new shake designs, and he began working on yet another variety. This time he ended up with a handsplit resawn shake which offered a flat surface for application to the roof and a natural split side for exposure to the weather. This shake, in heavy and light specifications, became the product which would cause Toke to spend the following 15 years of his life travelling extensively, particularly in the U.S., to build up the shake market. It was during this period, 1947 to the mid-1960s, that Toke almost single-handedly sold North America on the idea of cedar shakes.

Toke's marketing techniques were always right to the point. In order to convince potential buyers of the merits of his shakes, he would sometimes leave them with the impression that shingles were "inferior" to shakes. Understandably, this upset shingle mill operators, who finally sent a representative from the Red Cedar Shingle Bureau, an association representing shingle mills in both the U.S. and Canada, to tell Toke point blank to stop calling shingles "inferior."

"I knew I was between a rock and a hard place," Toke remembers, "so I decided to change my tune. From then on I was always sure to emphasize that shingles weren't 'inferior,' but I never forgot to mention that shakes were more aesthetically pleasing!"

Despite the opinion of his contemporaries that there was no large international market for shakes, especially for the more expensive resawn variety, by the mid-1960s Toke had succeeded in building up a market in about 20 key U.S. states and a clientele second to none in the industry. As Bill McLallen of Capilano Timber, a major force in the province's shingle business of the 1940s and 1950s remarks: "Toke really earned the title of 'The Shake King' by paving the way. All the shake manufactures in B.C. and Washington State rode his coat tails to prosperity."

PHOTO COURTESY TOKE

With his efforts to build a thriving market for shakes in the U.S., Europe, Hawaii and Japan, Toke began handling such large volumes of the product through his cedar mill in Mission that in 1957 he formed a separate company to take over this marketing function. Meeker Cedar Products became strictly a mill operation; the new marketing company, Anglo-American Cedar, today handles the total shake output from approximately 70 mills and small operators.

As Toke began to withdraw from active participation in the network of companies he had established or held interests in, his sons moved in to take up the slack. He recognizes that it is unusual for six sons in one family to follow in their father's footsteps, but what impresses him more is the fact that each of them has "enough on the ball" to make the complex of companies expand and prosper.

Looking back on his life's work, Toke likes to feel that there was far more to his business and his life than being successful and making money. He is particularly proud of his efforts and his companies' contributions in aid of the Salvation Army's Miracle Valley Alcoholism Centre. "Alcohol, darn booze, has destroyed so many good men and good businesses in logging that it's a real shame," says Toke. "Every cent I ever donated to that centre couldn't have been better spent."

Toke's story is impressive, but listening to his endless anecdotes one quickly realizes that he isn't bragging; he's simply telling it like it was, and still is. "At one time in the late 1950s I was operating two company offices, managing the mill, supervising rail shipment of orders, travelling all over the continent selling and taking orders, writing and printing pamphlets and brochures promoting the shake concept, and giving speeches. I was negotiating with governments, with unions, with all the large forestry concerns regarding salvage and logging rights. At the same time, I was making regular visits to the one hundred or so operators, whether mills or small independents, who sold us their product, and who often were partly owned or financed by my companies."

If you try to tell Toke that what he has just described sounds like the jobs of three, if not six different men, he just laughs and says: "Well, I did it!"

LETTERS

Two recent issues of ForesTalk have highlighted a long-standing communications gap between the forest industry and forestry practitioners on the one hand, and the general public on the other. The Canadian Institute of Forestry, the Canadian Forestry Association — and others — have tried hard to bridge this gap, but somehow the place of forestry in B.C.'s economy does not appear to be fully understood when budget money is to be allocated, nor is the importance of the forest industry recognized in the provincial scene.

Why has the gap developed? Why is the popular image of forestry practitioners still that of the dollar-oriented, "cut-and-get-out" exploiter, rather than that of a resource manager concerned with the long-term well-being of renewable resources? At least one part of the answer is that this popular view, which was valid some years ago, has become too firmly established to be easily changed. A second part of the answer is that foresters have tended not to speak out against misuse of the land; we have remained inarticulate when malpractice called out for rebuke. Most damaging of all, perhaps, is that too many have remained silent in the face of uninformed criticism. Amongst ourselves we have agreed that, although not all current practice is faultless, the bad old days have gone — and good riddance — but the communications gap which we have allowed to develop has grown into an information vacuum. That vacuum is being filled by environmentalists and others, by no means all well-informed. Not enough of us have gone to the general public, the electorate, and to elected representatives to explain in their terms why investment in forestry is essential to the welfare of the province. There are a few, a very few, creditable exceptions, and ForesTalk is an encouraging development, but one can wonder if we foresters really believe in forestry for the future, "in perpetuity," or do we pay only lip service to the idea?

The results of our professional inertia are painfully obvious to anyone who takes a look at the forest scene in B.C.: a huge back-log of inadequately regenerated cut-blocks, some 760,000 hectares at a recent count; an imminent threat of log shortages; insufficient investment in research and development, as exemplified by MacMillan Bloedel's expenditure of 0.39 per cent of net sales in comparison with Weyerhaeuser's 1.4 per cent, and MacMillan Bloedel has a better record in B.C. than any other firm; a Forest Service wherein the men in the forest each have to manage 10 times as extensive an area as their U.S. counterparts; and an under-funded Forestry Faculty at U.B.C. where, for example, there is but one forest economist, while Agricultural Sciences boast six agricultural economists — and this in a forestry province! The longer we wait ("the fault dear Brutus is not in our stars but in ourselves that we are underlings"), the greater will be the problem and the more costly its resolution. Oh yes, wood grows on trees, all right. But we're using it up faster than it grows, and, because of past mistakes, not much of it is growing in the right places.

What's to be done? The answer is as evident as the problem. We, the educated foresters, have got to start talking to the public and, since actions speak louder than words, we must demonstrate that we are truly responsible managers of the province's forest estate. Unfortunately, this sort of thing is difficult to demonstrate in the short run, so we must resort to the "soapbox approach". We must challenge any uncritical, negative, pseudo-environmentalist who declaims "woodsman, spare that tree", challenging him to come up with realistic alternatives. We must show clearly why investment in forestry is needed, and that good forestry is indeed ecologically sound. We need to halt the alienation of our remaining forested acres, explaining how every acre of flooded valley is an acre's worth of wood lost for ever — or at least until the reservoir fills with silt. Perhaps more difficult, we must explain that, when deciding between forestry and agriculture, the authorities must consider the long-term growth potential of a site, and not just the present standing crop. Can we not demonstrate that controlled harvesting in recreation areas need not be aesthetically distasteful since it does not have to be by clear-cutting?

Of course, like Caesar's wife, we must be above suspicion, condemning (in sound forestry practices whenever and wherever they occur, and basing our management on sound ecological as well as economic principles. Other professional bodies have powerfully effective lobbies; it's high time our voice was influential too. To make it so is part of our professional challenge. It's no longer enough to talk amongst ourselves.

R.M. Strang, Associate Professor
U.B.C. Faculty of Forestry

Re your interview with forester Jack Walters in the Summer 1979 issue of ForesTalk, can you give me space to comment so that Jack's views might be the start of a forestry dialogue from which the public can draw its own conclusions on this controversial subject? Otherwise, Jack's interview will be just another comment by foresters that falls back into limbo and justifies his view that, "historically, no one listened to what foresters had to say."

The gist of Jack's comments is to try and soften the harsh criticism of the forestry profession voiced by consultant forester Les Reed when he publicly pondered: "Where were the professional foresters when this sorry record (our present timber shortfall) was being written?" But, in effect, Jack's comments on foresters show them up as being incapable of speaking out so as to be heard, and he worsens their case by saying that "foresters do not know exactly what should be done because we don't have an adequate base on which to make ... judgments." The interview also reveals that there is no set 'forest policy' against which the public can measure the pros and cons of any forestry debate.

D.M. Trew
Victoria

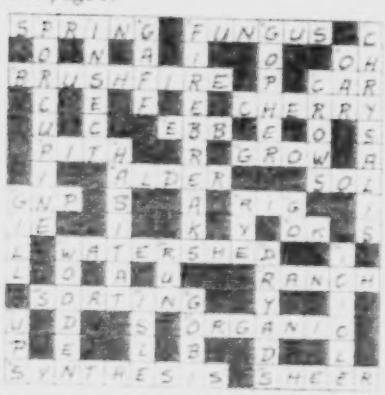
In the Forest Habitat article on Raccoons in the Fall 1979 issue of ForesTalk, you mention that raccoons eat wild honeycomb and the honey bee as well. With statements like that — which are true — the beekeepers will be on the lookout for my friend the raccoon. Raccoons are not enemies of the honey bee, but they still are a very harmful force. In other words, the raccoon loves to scratch around the entrance of a hive; as the bees come out to see what is going on, the racoon eats them up. However, I feel that having raccoons around the backyard is good because they eat up other problems that try to eat the honey bees or their hives.

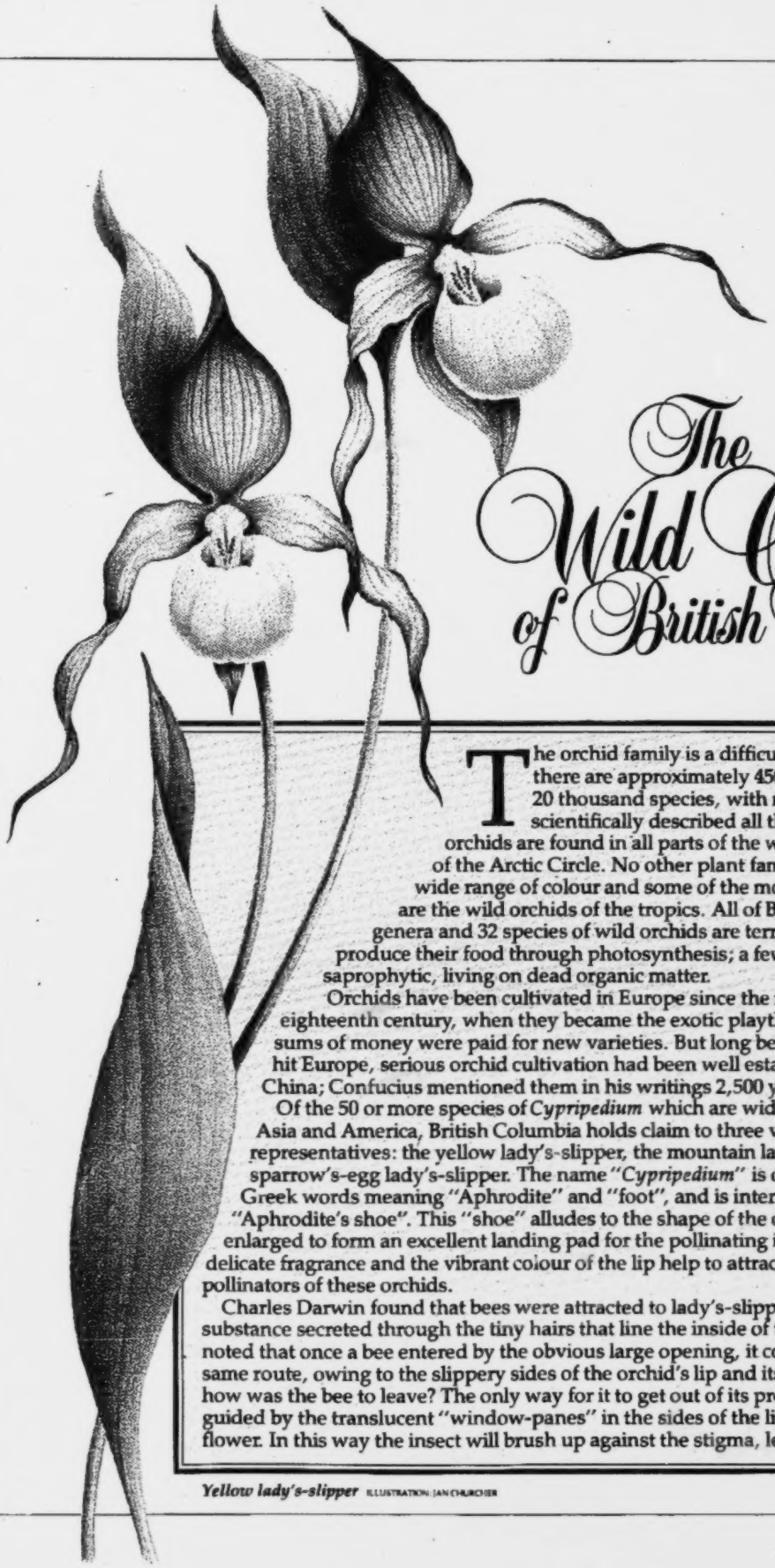
I am a part time beekeeper, and I made up a protective device that scratches back at raccoons, bears and skunks, without hurting them. It consists of nails sticking out in strips of wood over the front entrances of the hives. The animals get their noses pricked, get turned off, and leave in search of other food. The name of my device is "porcupine action boards." I've been using them for four years and not even a bear has got through them.

Forbes Moody
Victoria

Letters to the editor provide an opportunity for our readers to discuss topics arising out of ForesTalk. Letters for publication must carry the writer's name and address. Views published are not necessarily endorsed editorially. ForesTalk reserves the right to edit for publication.

Answers for ForesTalk Crossword
(see page 9)





Forest Habitat
by Enid K. Lemon

The Wild Orchids of British Columbia

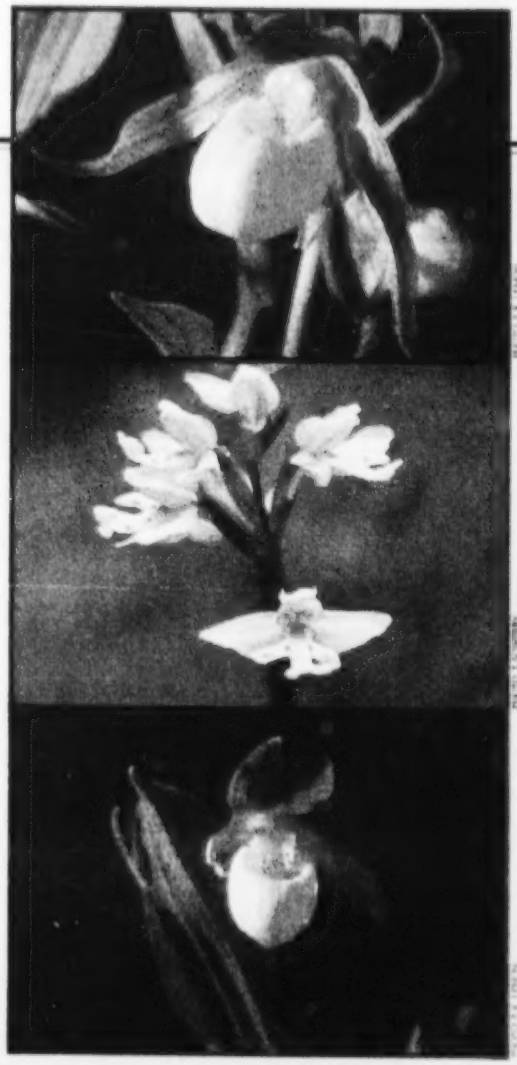
The orchid family is a difficult one to keep track of; there are approximately 450 genera and possibly 20 thousand species, with more being scientifically described all the time. Moreover, orchids are found in all parts of the world, including north of the Arctic Circle. No other plant family can boast such a wide range of colour and some of the most glamorous varieties are the wild orchids of the tropics. All of British Columbia's 11 genera and 32 species of wild orchids are terrestrial and most produce their food through photosynthesis; a few varieties are saprophytic, living on dead organic matter.

Orchids have been cultivated in Europe since the middle of the eighteenth century, when they became the exotic playthings of the rich. Vast sums of money were paid for new varieties. But long before "orchidmania" hit Europe, serious orchid cultivation had been well established in ancient China; Confucius mentioned them in his writings 2,500 years ago.

Of the 50 or more species of *Cypripedium* which are widespread in Europe, Asia and America, British Columbia holds claim to three very beautiful representatives: the yellow lady's-slipper, the mountain lady's-slipper, and the sparrow's-egg lady's-slipper. The name "*Cypripedium*" is derived from two Greek words meaning "Aphrodite" and "foot", and is interpreted to mean "Aphrodite's shoe". This "shoe" alludes to the shape of the orchids' lip, which is enlarged to form an excellent landing pad for the pollinating insect. The orchids' delicate fragrance and the vibrant colour of the lip help to attract bees, the usual pollinators of these orchids.

Charles Darwin found that bees were attracted to lady's-slippers by a nectar-like substance secreted through the tiny hairs that line the inside of the lip petal. He also noted that once a bee entered by the obvious large opening, it could not escape by the same route, owing to the slippery sides of the orchid's lip and its inrolled edges. So how was the bee to leave? The only way for it to get out of its predicament was to be guided by the translucent "window-panes" in the sides of the lip near the base of the flower. In this way the insect will brush up against the stigma, leaving behind any

Yellow lady's-slipper ILLUSTRATION: JAN CHURCHER



Yellow lady's-slipper (top), One-leaf orchis (centre), Sparrow's-egg lady's-slipper (bottom).

pollen that it may be carrying. When the bee then passes by one of the sticky male anthers, the pollen will adhere to its body like a mustard plaster. This pollen is eventually carried to another flower, thus completing the pollination process.

Once pollination has taken place, a capsule is formed, which later breaks open and scatters tiny seeds to the winds. Since these seeds lack certain nutrients, in order to take hold they must come in contact with a specific soil fungus which provide the missing nutrients. It takes five to seven years for BC.'s three species of *Cypripedium* to mature and flower. During this time there is a symbiotic relationship between the roots of the plants and a soil fungi called mycorrhizae. Without this relationship the plants will not survive.

The most common habitat of the yellow lady's-slipper is the southern half of the province, in mossy swamps and woods, along mountain streams, and even on damp rocky hillsides. The flowers are in season from May in the south to August in their northern range.

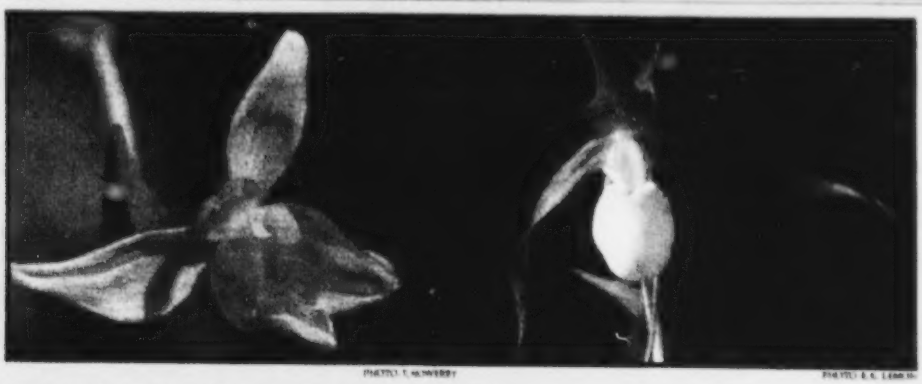
Mountain lady's-slipper has been found at elevations of five thousand feet, but it usually grows on subalpine slopes in cool rich humus. Like its relative, the yellow lady's-slipper, it also inhabits the southern half of the province, but it does not occur on the coastal mainland. Its range is limited to the southwest and southeast interior. The flowers of the mountain lady's-slipper, which are sweetly scented, resemble those of the yellow lady's-slipper, except for colouration. With its white lip tinged with delicate pink spots and its purplish-brown sepals, the mountain lady's-slipper is to many people the most attractive of the three species of *Cypripedium* of British Columbia.

Sparrow's-egg lady's-slipper was first identified by Dr. John Richardson, who was with Sir John Franklin's expedition to the Polar Sea. The species name is a Latin word meaning "sparrow-like", and refers to the purple-spotted lip which gives it a resemblance to the house-sparrow's egg. This orchid is essentially a northern plant, growing in mossy woods, deep ravines and moist coniferous forests, and can be found up to an elevation of 7,000 feet.

A rare variety of wild orchid found occasionally in B.C. is the giant helleborine (*Epipartis gigantea*), which is quite often over three feet high. The lip of this orchid is hinged; when the pollinator, a wasp, lands, the lip rotates, causing the insect to knock its head on the underside of the column. In this way the pollen is left on the stigma to produce a seed pod. The flowers of the giant helleborine are made up of green sepals with tinges of red or purple; the petals are shades of pink with purple veins.

One of the few areas in British Columbia where one can find the giant helleborine is the Mara Meadows. This unique spot in the province, located near Enderby in the interior, is a most important orchid habitat. It not only supports the giant helleborine, it is also the only location in B.C. where the yellow lady's-slipper, the mountain lady's-slipper and the sparrow's-egg lady's-slipper can be found growing together. This is all the more remarkable when one considers the differences in their habitats. Altogether, no less than 15 of the 32 species of wild orchids found in B.C. grow in this tiny area. But the importance of Mara Meadows to orchid lovers does not stop here; it is the only place in the province where the ten orchid (*Liparis loeselii*) is known to exist.

The special nature of Mara Meadows was recognized back in 1972 when the government set aside 365 acres as an Ecological Reserve. The size of the reserve was increased to 466 acres in 1974. The official description of Mara Meadows states that it is a "unique low moor meadow swamp with calcareous tufa formation." This habitat and the vegetation it supports is not found anywhere else in the province. Consequently, great care must be taken to protect the meadows from any damage, and a permit must be obtained to enter the area.



Perhaps the tallest orchid growing in British Columbia is the tall white bog-orchid *(Habernaria dilatata)*. It thrives in sunshine, and grows in bogs, swamps or wet meadows. The whiteness of the flowers plus the sweet fragrance eminating from the blossoms in a mass of three-foot plants is a sight and smell not easily forgotten. The tall white bog-orchid is one of 11 species of rein orchids *(Habernaria)*found in B.C., all of which grow in boggy habitats. The name "*Habernaria*" comes from the Latin word meaning "strap" or "rein", and refers to the shape of the flowers' lip and spur. These rein orchids are frequently pollinated by the skipper butterfly.

Although approximately one hundred species of the Orchidaceae family of orchids exist world-wide, B.C. is home to but one of them — the one-leaf orchis *(Orchis rotundifolia)*. The one-leaf orchis is a slender flower about ten inches high, with showy sepals and petals ranging in colour from white to pale purple. It has a purple spotted white lip split into three lobes. The one-leaf orchis is most commonly found in the southwest and northern interior of the province.

These are just some of the fascinating wild orchids of British Columbia, and well worth looking for as one walks through our forests. The woods become that much more enjoyable if we open our eyes to the flora that grows below the trees.

Giant helleborine (top left and illustration)
Mountain lady's-slipper (top right)
White bog-orchid (bottom)

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